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Edited by
J. F. F. REID
Associate Editor
C. W. WINDERS, B.Sc.Agr.

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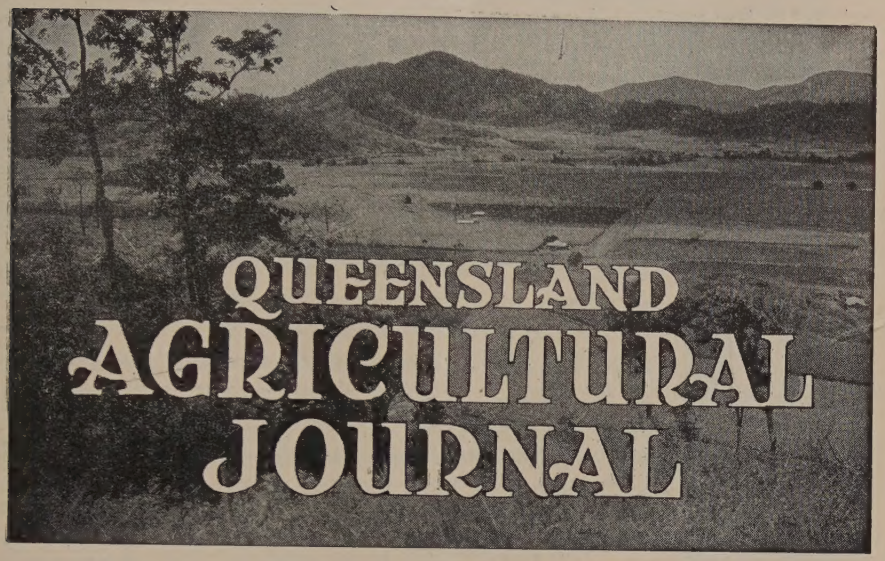

Volume 66 1 JANUARY, 1948 Part 1

Event and Comment.

The Junior Farmers' Club Movement.

A SYSTEM of rural education which will fulfill the needs of the new agriculture goes far beyond the mere mechanics of farming, affecting every aspect of the life of the farmer. It will give him from early boyhood an unconscious philosophy towards the land and a real regard for that which gives security to himself and his family, stability to his way of life and essential community service.

Hand in hand with better educational facilities in the country must go ways and means of developing improved farming techniques and of ensuring the maintenance of a prosperous, virile, well-informed and enterprising rural population which is so vital to the future security of Australia. Among the ways and means is the Junior Farmers' Club Movement to which every encouragement to its establishment in Queensland should be given. In the southern States this organization, many thousands strong, already exerts an influence for good, an influence spreading and deepening as time goes on, taking a major part in strengthening the economic structure of the land industries and demonstrating that the practice of agriculture along scientific lines is something much more than just another way of making a living.

In other parts of the Commonwealth the Junior Farmers' Club Movement has taken firm root and its extension to this State will, no doubt, be welcome, particularly as a lead to the recognition of agriculture —the science of food production—as worthy of a first place in our national educational curriculum, a place already achieved under the stress of war in our national economy.

THE MINISTER'S NEW YEAR MESSAGE TO THE FARMERS OF QUEENSLAND

THE recent bountiful rains may be accepted as a happy augury for the New Year, presaging, it is hoped, good seasons and heavy harvests at a time when food is among the world's most urgent needs.

The past year was one of expanding activity in the Department of Agriculture and Stock. Several new undertakings of first importance to the land industries were inaugurated. Two new branches were established within the Department to deal with problems of soil conservation and the husbandry of beef and dairy cattle; and a price and crop reporting service was instituted within the Division of Marketing. Further development and extension were recorded in projects for systematic fodder storage, pasture improvements, plant breeding and protection and field trials of crops new to Queensland agriculture.

Hon. H. H. Collins

The Department is an essential part of our rural organization. Its administration is planned and its efforts are directed to the service of farmers, graziers, and others engaged in primary production. Through its technical and advisory staffs the Department keeps in close personal touch with producers on their own holdings, helping them in the solution of their problems with authentic information based on field experiments and trials, experienced advice and practical demonstrations. The degree of success is, however, measured by the degree of co-operation accorded by the producers themselves. It is expected of them that they, in their own interests, should make use of all the services available to them through the highly trained officers of the Department whose life work is the advancement of agriculture and animal husbandry in this State.

In a changing world there is one thing that does not change and that is the land itself. No matter what else happens, the land remains to give us a living, a living in accordance with our efforts to serve the land and our wisdom in using it.

On behalf of the officers of the Department, and personally, I wish the primary producers of Queensland all good in the coming year, health and happiness in their homes and a continuance of the prosperity of which present seasonal conditions are a cheerful portent.

H. H. Collins

Secretary for Agriculture and Stock.

Department of Agriculture and Stock,
Brisbane, 1st January, 1948.

Canary Seed.*

C. S. CLYDESDALE, Senior Adviser in Agriculture, Toowoomba.

THIS grass, which furnishes the canary seed of commerce, is a native of the Mediterranean region. It is fairly widely cultivated in warm temperate countries for seed purposes, and is used in Queensland for grain and grazing. It is an annual tufted grass with very soft leaves and a fairly shallow root system. The stems are erect and bear short, ovoid seedheads with a dense formation of flowers. The seed is light yellow in colour, hard and shining.

Owing to Australia's limited requirements of bird seed generally, canary seed is regarded as a minor crop, but nevertheless it has proved a useful source of revenue to many Downs farmers, particularly during seasons when late rains have prevented a full normal sowing of wheat. In Queensland, the Darling Downs wheat lands provide the bulk of the area sown, Allora, Warwick, Clifton, Pittsworth, Oakey, Brookstead, Cecil Plains, and Dalby being the most important centres, though canary seed is also produced in the South Burnett district. The heavy black Downs soils appear very suitable for the production of this crop, and as standard wheat cultivating and harvesting machinery can be employed no extra outlay is entailed for machinery.

Preparation of the Soil.

As for other winter growing cereals, the land intended for sowing canary seed should receive a thorough preparation when it is intended to grow for grain. A summer fallow is essential in order to conserve much of the summer rainfall, which normally provides most of the moisture requirements of the canary seed crop. The land should be ploughed or sundercut early in the summer to a depth of 3 to 5 inches and allowed to lie in a rough state for a few weeks, so that it will break down well on harrowing. Weeds should be destroyed periodically during the fallowing period by harrowing. This operation will also prevent a hard crust forming and maintain the desired soil mulch.

Sowing.

Sowing may be carried out from March to May and the seed is drilled rather than broadcast, as it not only makes a good strike more certain but also is more economical of seed. Sowing at the rate of 8-10 lb. per acre will produce a good stand if drilled in, but at least 30 lb. are required if broadcast. About 2 inches is a satisfactory depth at which to sow, and with the drill it is a simple matter to ensure that

* *Phalaris canariensis* L.

the seed is sown at this depth, though when broadcast seed is harrowed in the depth of soil covering is likely to vary considerably. Once established, canary seed is a fairly drought resistant crop.

Grazing or Feeding Off.

On the self-mulching types of Downs soils the young plants are easily pulled out by sheep or cattle; grazing consequently should not commence until the plants are firmly rooted. This should be about six or eight weeks after planting or when the plants are about 6 inches tall. The crop can be fed off at intervals until September or October. If it is intended to harvest for grain, the crop should not be grazed later than July. The time to cease grazing is before the seed heads have developed and this can only be ascertained by examining the plants. If grazing should take place after the seed heads have formed, the plant will have to produce further seed heads from the base and the resultant yield of grain will be greatly reduced.

Harvesting.

The crop may be utilized entirely for grazing or it may be cut for hay. However, it is preferable to harvest the seed, as yields of hay secured from this crop are lighter than those obtained from oats or wheat. As buyers demand a first class article, free from broken or shelled seed, great care must be taken during harvesting operations. It may be thought that the inclusion of broken seed amongst sound grain is of little moment, but it is an acknowledged fact that canaries will not accept as food that grain which has been shelled, preferring to shell their own.

Although modern machinery has reduced the cost of harvesting, probably no sample of canary seed harvested by such means equals that which is harvested by the reaper and binder, and afterwards threshed. The maturing of grain and head, which takes place in the stooks, overcomes those difficulties which are associated with the use of modern harvesters which cut, thresh, and bag the grain in one operation. Some growers value the old system so highly that when they are harvesting for seed purposes they cut their crops with the reaper and binder and thresh with the header.

Under normal conditions an average crop of canary seed is from 4 to 6 bags, or 600 to 900 lb., per acre.

Marketing.

At the present time canary seed is sold on the open market and the prices are still controlled. The ceiling prices are £25 per ton for ungraded seed, while graded seed is worth £28 10s. per ton but must not contain more than 2 per cent. inert matter.

"FARM BOOKKEEPING" OUT OF PRINT.

The brochure "FARM BOOKKEEPING" is now **OUT OF PRINT.**

Readers who have applied for copies in response to announcements in previous issues of "The Queensland Agricultural Journal" are asked to accept this notice as an intimation that copies of the departmental publication "FARM BOOKKEEPING" are **NO LONGER AVAILABLE.**

STORY OF THE DEPARTMENT OF AGRICULTURE AND STOCK.

PART 3.

(*Continued from page* 129, *Q.A.J. for August,* 1947.)

J. F. F. REID.

QUEENSLAND PRODUCTS OVERSEAS.

FROM its earliest years, the Department of Agriculture recognized the advantage of sending officers overseas from time to time to investigate problems of particular interest in relation to Queensland agriculture, or to observe new developments and progress in rural industry in other countries.

In accordance with this policy, A. H. Benson, Instructor in Fruit Culture, was sent to the Franco-British Exhibition in 1908 at which the Queensland Court was an outstanding feature of the general Australian display. Included in the exhibits sent by the Department were wool, meats and other pastoral products; dairy produce; and a wide range of agricultural products in both raw and processed forms. In the course of his comprehensive report which is preserved in the departmental records of 1908-9, Mr. Benson contrasted, by inference, the modesty of Australian exhibitors with the magniloquence of those from other Dominions. "Canadians know how to advertise their country," he commented, "and miss no opportunity of doing so. They believe in their country and show the bright side to the world. You never hear a Canadian complaining of their long and trying winter, but are constantly singing the praises of their summer and the wonderfully rapid growth of all crops during that season. In many ways we can take a lesson from the Canadians, both in the manner of exploiting the resources of our State and by showing confidence in our country, as we possess many natural advantages that Canada is without."

In that year, small but representative exhibits of Queensland products were displayed at the principal agricultural shows of England, Scotland and Ireland, including the Royal Agricultural

Queensland Ministers for Agriculture.

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Since 1915.

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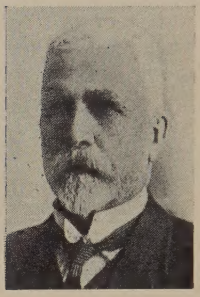


HON. WILLIAM LENNON.
June, 1915-September, 1919.

HON. W. N. GILLIES.
September, 1919-February, 1925.

HON. W. FORGAN SMITH.
February, 1925-May, 1929.

HON. HARRY F. WALKER.
May, 1929-June, 1932.

HON. F. W. BULCOCK.
June, 1932-December, 1942.

HON. T. L. WILLIAMS.
December, 1942-March, 1946.

HON. H. H. COLLINS.
March, 1946-

Plate 1.

Society's Show at Newcastle, the Lincoln County Show, the Highland Agricultural Society's Show at Aberdeen and the Dublin Horse Show. Mr. Benson represented the Department at all these gatherings.

Queensland also was associated with other States in the mission of W. W. Froggatt, entomologist of New South Wales, in the same year to Hawaiian Islands, United States, and West Indies to investigate developments in the control of the fruit-fly pest and to study other entomological problems. His report, included in the annual review of departmental activities, also makes interesting reading in the light of later successes in the control of pests and diseases of plants and animals in this State.

A YEAR OF PROSPERITY.

1908 was a year of agricultural and pastoral prosperity in Queensland, except in parts of the South-western and Darling Downs districts, where long, dry periods had prevailed. Timely rains saved the wheat harvest which exceeded anticipations, in respect of both yield and quality.

Values for primary products were high throughout the year, largely because of adverse seasonal conditions in the southern States, where there was a consequent strong demand for Queensland's exportable surplus.

Fodder Conservation.

The perennial question of systematic fodder conservation was discussed in the annual report of the Department. "This subject," said the Under Secretary (Mr. Scriven), "has been repeatedly brought up in successive reports, and though ensilage and other methods of provision are slowly taking hold on the farming community, it is to be regretted that the practice has not yet become general. An object lesson was recently given at the Rockhampton Show, where the State Farm, Gindie, exhibited excellent bush hay, cured in 1902, that was still nutritious and sweet."

The Banana Industry.

Much attention was given to the development of the banana industry in that year. Its annual value was then well over £100,000. The renovation of exhausted banana lands was planned and experiment areas in the Geraldton (afterwards renamed Innisfail) and Buderim districts were selected with the object of proving the profitability of manuring existing plantations as against "the wasteful practice . . . . of abandoning an exhausted area and clearing new land." The main banana districts were then the Blackall Range, from which Brisbane and Sydney markets were supplied, and Geraldton (Innisfail) and Cairns, which fed the Melbourne and Adelaide markets. Competition with Fiji for the Southern demand had caused considerable concern, added to by the decline in production in the far North, which was ascribed to number of causes, "one of which was the extensive clearing of fresh lands when the trade was very good, the cost of which was not recouped when later, because of the glut in the market, prices fell considerably." The last devastating cylone (that of 1906) and the "Southern restrictions" were important factors "in reducing the energy of growers," but in reality "the biggest danger to the trade," it was reported, was "the practice in the North of obtaining suckers for replanting from whatever stocks are available

. . . . instead of planting the best only, a pernicious practice when the reputation of the trade is in jeopardy. It is from this cause that the complaints have arisen in the South regarding the quality of the fruit offered for sale." Another factor was the change over by Chinese growers from banana planting to cane cultivation in some sugar-mill areas. In after years, as shall be recorded later, banana growing expanded substantially, and in one year the annual value of the industry to Queensland attained a total of approximately £1,200,000.

Cotton.

Cotton was again coming into consideration as, potentially, one of Queensland's most important crops. In 1890, at a farmers' conference at Beenleigh, Professor Shelton, speaking of the possibilities of cotton in Queensland agriculture, said: "It is one of the new industries we cannot make too much of." In the annual report of 1908-9 that opinion was quoted and endorsed with this addendum: "There is in Australia a sufficient market for all the cotton that Queensland can grow for some years to come, and the institution of a bonus given by the Commonwealth will be another incentive towards an extension."

The quality of the samples of Queensland cotton displayed at the Franco-British Exhibition was highly commended by men of wide experience and expert knowledge. Many years were to pass, however, before cotton became listed regularly in our cropping programme. Average returns in the season amounted to £8 an acre, with £11 to £17 for individual yields.

Dr. David Thomatis, a planter of Cairns, evolved, by hybridization, three distinct varieties which, it was reported, possessed "all the best attributes of the best Sea Island variety with other qualities which make them superior to any yet produced in this State." To these cottons the name of Caravonica was given, and "the high prices . . . . they realized in the European markets" were "evidence of their excellence." Cotton growing was gradually extending, "notwithstanding the difficulty of re-establishing an industry which has twice been allowed to lapse."

Sugar.

The cane crop total in 1908 was 1,433,315 tons, of which 88·62 per cent. was produced by white labour. The number of employees in the industry was 4,345; value of machinery, £1,839,902; and the value of land under crop was given as £347,873. The output of sugar in both Queensland and New South Wales was approximately 27,000 tons short of Australian requirements; consequently, fear was expressed that importations from coloured-labour countries might affect the future of the sugar industry in Australia. The "allurements of the dairying industry" was suggested as a reason for a decline in cane production on the Northern Rivers of New South Wales.

Molasses, as a sugar-mill by-product, was in the news at that period, and among various proposals for its economic use was one for the treatment of cancer in cattle. As a stock food, molasses was gaining favour, and it was reported that "as the quantity of waste each year is enormous, the value of it, when mixed with other foods, should be more widely known." An offer from America to purchase "practically the whole of the output at 4 to 5 cents a gallon" was communicated to the sugar mills, but no response is recorded.

Wheat.

Queensland-bred wheats were attracting attention on the score of quality and bushel weights. "In the matter of quality, perhaps no better illustration could be given that the abnormal bushel weights of wheats entered for competition at the various country shows, where many samples tested on standard measures exceed 67 bushels," it was stated in official files. Average yields of over 20 bushels to the acre were harvested that season in some localities on the Darling Downs. One variety sown at the Roma State Farm yielded 37 bushels to the acre. These satisfactory results were attributed to improved methods of cultivation, including frequent tillage.

To foster cereal growing, the Department instituted a system of free distribution of single bushels of graded seed wheat for field trials to interested farmers. The best result of this farm plot work was a yield of 75 bushels of grain from one bushel of seed sown, which was obtained by A. N. Griffin, of Roma. "There is reason for the fulfilment of the hope that the more progressive section of wheatgrowers are becoming alive to the advantages of adopting more systematic cultural methods" was the official comment, to which there was this frank addition: "It is regrettable to observe that whilst many in the drier districts are unsuccessful in obtaining payable returns, an explanation . . . . is in most instances traceable to slip-shod methods in the treatment of the soil."

Dairy Production.

In 1908, Queensland was still in third place as a butter-producing State with an output of nearly 24,000,000 lb., but held the lead in the production of condensed and concentrated milk.

THE TICK PEST.

Some interesting facts emerge from the spirited reply by the Department in its annual report to Southern criticism and to charges of inactivity in respect of the cattle-tick pest which had spread to New South Wales.

The tick was first observed as a pest in 1894 in unfenced cattle country of North-west Queensland. Apparently the first recorded occurrence of the redwater disease in cattle, transmitted by the cattle tick, was in a mob belonging to Dr. Brown and travelling from the Roper River in the Northern Territory, by way of Queensland, to Newcastle Waters in the winter of 1886. The nature of the pest was then quite unknown, and experience of it had to be gained before the checking of its advance could be attempted. "If the tick had reached Queensland like the rabbits by way of New South Wales and through settled districts," stated the Under Secretary, "there would be a better chance of checking it than was possible by reason of its progress through unsettled districts in a region where climatic conditions were favourable to it. Much money has been spent in experiments, in constructing dips, in ascertaining the best mixtures for destroying the tick, and in finding out the best treatment for the fever resulting from infestation."

Dr. Hunt and W. Collins were sent to America to inquire into cattle-tick infestation there. The Stock Institute was established to investigate animal diseases, including tick fever and redwater, under

the direction of C. J. Pound. Inspectors were appointed to control the movements of stock. Experiments in inoculation were conducted and other methods of tick control were adopted. In addition to Government dips, 1,050 private dips were constructed and many more, no doubt, were unrecorded. Analyses of dip mixtures also were undertaken. Local authorities were subsidized to provide public dips in their areas. Subsequently, inoculation against tick-caused ailments under the supervision of the Department was arranged; in the year 1907-8 no fewer than 34,000 cattle were so treated.

To further facilitate research into tick and other animal diseases, a completely equipped stock experiment station was established by the Department at Yeerongpilly under the direction of S. Dodd, F.R.C.V.S., who had had a long experience of stock disease control in South Africa and whose appointment was recommended by the Royal Veterinary College.

QUEENSLAND'S 50TH ANNIVERSARY.

In 1909 occurred the 50th anniversary of the foundation of Queensland as a colony. The Parliamentary Papers of that year contain a review, incorporated in the report of the Department, of rural progress since 1859. The estimated population of Queensland in 1859 was 25,020 people of European origin, most of whom, the departmental recorder assumed, had no direct association with country life and industry.

The total area under cultivation was then 3,353 acres; imports were valued at £742,023, and exports at £523,476—mostly agricultural and pastoral products, chiefly wool. In the year of separation from New South Wales, livestock statistics included: Horses, 23,504; cattle, 432,890; sheep, 3,449,350; pigs, 7,147.

The average yearly wages for rural workers were: Farm labourers £45; shepherds, £40; women farm workers, £25 and keep. As illustrative of the official outlook of the time, the report of the Registrar-General (Darvall) for 1860 is of particular interest. An extract: "As yet, agriculture has made little progress; the high rate of wages [sic], uncertainty of getting labour when required, and the difficulty of conveying produce to market—over roads always bad, and often impassable—have hitherto made it more economical to import almost all kinds of agricultural produce than to grow them. Sufficient has, however, been done to show that while the higher tablelands of the interior are well adapted to the growth of cereals and other vegetable production of the temperate zones, the lowlands lying near the sea, and along the banks of Eastern Rivers, are capable of producing the most valuable productions and luscious fruits of the torrid zone—viz., cotton, sugar, coffee, arrowroot, the pineapple, bananas, mango, &c., &c."

In its 50th year, 1909, Queensland had a population of 558,237; the area under cultivation was 650,472 acres; and livestock numbers included: Horses, 519,969; cattle, 4,321,000; sheep, 18,348,851; and pigs, 124,759. Agricultural exports represented 19·02 per cent. and pastoral exports 50·28 per cent. of the whole export trade of the State.

[TO BE CONTINUED.]

Management of the Orchard Soils of the Stanthorpe District.

A. A. ROSS, Horticulturist.

THE orchard soils of the Stanthorpe district are all of granitic origin. The area of alluvial soil in the district is very small and it is used almost exclusively for vegetable growing. Like all soils derived from granite, that typical of the Stanthorpe district is of sandy texture and in many places is found to be relatively coarse. In its uncleared state it supports an open forest formation, which provides only a meagre supply of organic matter, with the result that even newly cleared land is relatively deficient in humus. The unimproved soils are often poorly supplied with several of the common plant foods. A shortage of nitrogen is indicated by the marked response frequently obtained from applications of nitrogenous fertilizers, especially with stone fruit trees. In addition, a deficiency of the trace elements, zinc, boron, and copper, has been found in many parts of the district.

The soil management practices commonly adopted in the past have followed a system of frequent and usually deep cultivation which has the effect of reducing very rapidly the already low organic matter content. The store of mineral nutrients has been depleted by excessive leaching and erosion. As a result, many orchards in the district are gradually declining and some have been abandoned. It is obvious, therefore, that, in order to arrest this decline and to maintain the full productive capacity of the soil, a system of management must be followed which not only conserves to the utmost the organic matter and the plant nutrients already in the soil but also supplements the supply of those constituents which are present in inadequate quantities.

THE PART PLAYED BY ORGANIC MATTER IN THE SOIL.

In order to appreciate the full importance of organic matter in the soil, it is necessary to have some understanding of the role it plays in plant nutrition and in soil-forming processes. Organic matter is one of the fundamental soil constituents which govern plant growth, as it directly and indirectly influences the biological, physical, and chemical conditions of the soil.

When organic matter is added to the soil, it is acted upon by several types of micro-organisms and decomposed into a variety of products, the commonest of which is known as humus. If there is an

abundance of humus in a soil the soil organisms are kept at a high level. The activity of these organisms greatly influences the availability of certain plant foods which otherwise may be held in the soil in a "fixed" form, that is, in a form unavailable to the plant.

The chemical composition of the soil is directly affected in that much of the organic matter consists of plant food materials which, as decomposition proceeds, are released in a form in which they can be freely utilized by the growing plant.

In so far as the physical condition of the soil is concerned, organic matter influences three factors, viz., soil colloids, soil structure, and soil moisture.

Soil Colloids.

The colloidal material present in a soil is very closely associated with plant nutrition because it is from its surfaces that nutrients are absorbed by the roots of plants. The colloidal complex of the soil is composed of extremely minute mineral particles, or clay, and equally minute organic particles represented by humus. The proportion of clay in a soil is an inherent property and it cannot be altered by any practical farming methods. The organic fraction of the colloidal complex, on the other hand, can be changed. Under normal farming practice it is diminished by operations such as cultivation and burning of stubble and increased by the addition of organic matter.

Soil Structure.

In the absence of organic matter, a soil is inclined to develop a "single-grained" structure wherein each soil particle exists as a separate individual. This condition is most undesirable. It prevents adequate aeration and, because the surface pores become clogged easily during rainy periods or when water is applied by irrigation, reduces the rate of penetration of water through the soil surface. Aeration can be retarded to such an extent as to influence adversely the growth of the plant by restricting the exchange of gases between the roots and the soil air. This is experienced in the case of waterlogging. For the normal activity of micro-organisms in the soil, a supply of oxygen is required and this may be partly withheld in a soil of poor structure with inadequate aeration.

On the other hand, when there is an abundance of organic matter present in the soil, the formation of a desirable "crumb" structure is encouraged whereby the soil particles become cemented together into aggregates which are relatively stable. Such a condition greatly improves the porosity of the soil, which in turn assists aeration. By resisting the beating action of rain, a crumb structure also tends to keep open the surface pores. This allows the free entry of a greater volume of water and delays the formation of surface puddles which are the starting points of soil erosion.

Soil Moisture.

If a relatively impermeable crust is allowed to develop on the surface of the soil, as so readily happens when the organic matter supply is low, the proportion of rain water which runs off, instead of penetrating the soil, is relatively high, thus considerably reducing the amount of moisture which will become available for the use of the

orchard trees. Under the non-irrigated farming methods adopted in Stanthorpe orchards, every season there is liable to occur a period of moisture deficiency in the soil. Records indicate that this happens fairly regularly during early January, and in poorly managed orchards is reflected in the slow increase in size of Jonathan apples. If this is to be avoided the absorptive capacity of the surface soil must be increased to a maximum. Organic matter in all stages of decomposition has a relatively high affinity for water. If present in a soil in sufficient quantities, therefore, it will have the effect of increasing not only the water-absorbing capacity but also the water-retaining properties of that soil.

Plate 2.

A Good Crop of New Zealand Blue Lupins, which Yielded 30 Tons per Acre (Green Weight).

METHODS OF SUPPYLING ORGANIC MATTER TO THE SOIL.

Although very commonly the case, it can only be considered a poor policy to allow a soil to deteriorate to the stage where nutrient deficiency symptoms appear in the plants grown before adopting some system of soil improvement. The appearance of such symptoms in fruit trees occurs only after the deficiency has been experienced for some time. Therefore, in many cases, recovery may be expected to be delayed for a considerable period following the adoption of remedial measures. A policy of prevention should be favoured in order that the plant should not receive a nutritional setback at any stage of its life. Special attention should be given to ensuring that proper soil management practices are adopted from the time land is first cleared so that there is a steady improvement in fertility instead of a gradual decline.

Possibly the commonest method of supplying organic matter to the soils in older countries is the application of farmyard manure. Under Queensland conditions, farmyard manure is not available in large quantities, partly because here animals are not housed during the winter and partly because much of the tractive power used on farms is now mechanical. Other organic by-products, such as sheep manure, sawdust, and straw, are not available in the Stanthorpe district and, as transport of sufficient quantity to constitute an effective dressing would not be economic their use cannot be advocated. The growing of green manure crops is, however, quite a practical and economic proposition. In the majority of seasons, if proper cultural methods are adopted, very satisfactory crops can be produced. Preference must be given to those crops which have the capacity to produce a large quantity of green material when grown during the winter months. Moreover, since the soils of the district are fairly uniformly deficient in nitrogen, a leguminous crop, which will transfer atmospheric nitrogen to the soil, should be selected wherever possible.

Plate 3.
A CROP OF RYE WHICH YIELDED 7 TONS PER ACRE (GREEN WEIGHT).

APPLICATION OF ARTIFICIAL FERTILIZERS.

The question of how to fertilize deciduous fruit trees is one which cannot be completely answered. In the Stanthorpe district, experiments have not been able to show that any of the fertilizer ingredients produce very marked effects on the growth or yield of apple trees. However, very definite responses have been obtained from the application of nitrogenous fertilizers to stone fruit trees, while soil dressings of the trace elements, boron and copper, have been effective in overcoming

certain deficiency symptoms*. Further experiments may show that fertilizers have some influence on keeping quality of fruit, as has been demonstrated elsewhere. But, for the present, it would appear an unwise practice to apply large quantities of artificial fertilizers to deciduous fruit trees, with the exception of stone fruits.

Green manure crops have been shown to respond very definitely to the use of artificial fertilizers in Stanthorpe soils. Therefore, in the present state of knowledge, the safest course to adopt in fertilizing an orchard is to aim at producing the greatest possible amount of green manure from each planting by fertilizing the green crop. As a result of experiments conducted along these lines, it has been found that leguminous crops do best when grown on a fertilizer mixture containing moderate amounts of nitrogen, relatively high proportions of phosphate and small quantities of potash.

Plate 4.

A Desirable Condition of the Surface Soil Following Turning In of Green Manure Crop.

A mixture of approximately 4:15:2 formula would be considered suitable. The quantity to be applied per acre will vary according to the fertility of the soil at the time of planting, but, on an average, a dressing of 2½ cwt. per acre will suffice. Cereal crops, on the other hand, respond only to nitrogen in these soils and therefore phosphates and potash can be safely left out of the fertilizers used for growing them. A satisfactory rate of application is sulphate of ammonia 1½ cwt. per acre, or nitrate of soda 1¾ cwt. per acre.

* The treatment of trace element deficiency disorders in deciduous fruit trees is described in Departmental pamphlet No. 103, which can be obtained on application to the Under Secretary, Department of Agriculture and Stock, Brisbane, or from the Stanthorpe Field Station.

METHODS OF CULTIVATION.

The system of clean cultivation commonly adopted in the past has resulted in rapid depreciation of much of the soil of the district and a somewhat revolutionary programme of permanent soil conservation needs to be introduced now to maintain economic farming in the future. Such a programme must commence with proper methods of cultivation. It must always be remembered that constant tillage is the most rapid means of depleting the supply of humus in the soil, especially during the summer. Depletion of the humus is quickly followed by the destruction of the crumb structure of the soil and this, in turn, induces soil erosion. The question of whether cultivation conserves moisture is no longer held in doubt. It has been proved by numerous investigations that moisture is conserved by cultivation only by the control of weeds

Plate 5.

TURNING IN A 30-TON CROP OF NEW ZEALAND BLUE LUPINS WITH TANDEM DISC HARROWS.

and that the stirring of an already clean surface achieves nothing in the way of saving moisture. At present, throughout the world there is a tendency towards shallow cultivation just sufficient to keep weeds in control, and to break any surface crust which may form, so that, when rain falls, penetration will be increased and run-off reduced.

The method of cultivation which has the best prospects of success in orchards is trashy cultivation or stubble mulching. In this system, winter green manure crops, weeds, &c., are not turned completely over and buried as is done in the operation of ploughing but are merely chopped up and incorporated with the top few inches of soil. It will be noticed that under natural conditions, e.g., on the forest floor, the litter or organic matter is on the surface of the soil.

It follows from this observation that, in the process of soil building, improvement should proceed from the top as it can be safely left to

the leaching action of rain to carry the products of decomposition downwards through the soil. A layer of trash-soil mixture increases the absorptive capacity of the soil surface and at the same time checks the flow of water during heavy falls of rain. Thus, on even moderate slopes it can have a considerable controlling influence on soil erosion. In addition, it tends to reduce the temperature of the surface soil and this, during dry periods, has the effect of minimizing the loss of moisture from the soil by evaporation.

This system of cultivation really calls for the introduction of some new types of implements. Many such machines have been experimented with in overseas countries and it may be expected that, in the near future, these will be available in Queensland. However, certain of the implements which are already in common use will provide a good substitute, if handled correctly. Tandem disc harrows and rotary hoes, adjusted to shallow working, say 2-3 inches, make an excellent job of turning in green manure crops, but the operator must be taught that the ideal finish is one where the surface is left rough, with a certain amount of the plant material still uncovered. Complete burial is the condition which must be avoided.

SUMMARY.

The organic matter content of the majority of the soils of the Stanthorpe district is low and this is the material which must receive first attention in any soil building programme.

Soil organic matter has the effect of improving the structure of the soil, of liberating plant food materials which are present in the soil in an unavailable form, of increasing the effectiveness of artificial fertilizers, of assisting aeration of the soils, of providing better conditions for microbial activity, and of protecting reserves of plant nutrients from loss by erosion.

The growing of green manure crops is the most practical method of increasing the organic matter content of the orchard soils of the Stanthorpe district.

The most economical and effective method of fertilizing these orchard soils is to apply fertilizer to the green manure crop with the object of obtaining the maximum yield. The plant food ingredients of the fertilizer are not lost to the trees by this practice but ultimately may even be rendered more readily available. In addition, with leguminous crops, nitrogen will be accumulated. A satisfactory dressing for leguminous green manure crops is 2½ cwt. per acre of a mixture of approximately 4 : 15 : 2 formula, and for cereals 1½ cwt. per acre of sulphate of ammonia or its equivalent nitrogen content in some other form.

Frequent cultivation of these soils does not conserve moisture beyond retaining that which otherwise would be consumed by weeds. On the other hand, it hastens the depletion of humus and has a bad effect on soil structure.

Shallow, trashy cultivation is preferred to deep working and to the maintenance of a perfectly clean surface, as it reduces the tendency of a soil to erode, improves the structure of the surface soil, increases the absorption of water during falls of rain and reduces evaporation of moisture from the soil.

PLANT PROTECTION

Control of Field Crop Diseases.

R. B. MORWOOD, Pathologist, Science Branch.

TO the fruit and vegetable grower the control of plant disease usually means the use of a spray or a dust containing a fungicide. With a few exceptions such methods are too expensive to be applied to crops grown on a large scale. On the farm other precautions are taken to minimise losses from disease. Cultural methods which produce a vigorous crop are of some assistance and the use of resistant varieties, when available, is an obvious advantage. These notes deal with three more direct disease control measures applicable to crops grown on a large scale but not of as high a value per acre as fruit and vegetables.

SEED TREATMENT.

Winter Cereals.

The most widely used direct disease control measure in field crops is seed treatment. This has been practised for a long time in the case of cereal smuts. In one of the earliest treatments wheat was dipped in strong salt solution. This was later replaced by weak solutions of bluestone, and now most cereals are treated with a fungicidal dust before planting. It is interesting to note that an Australian, Dr. Darnell Smith, was the first plant pathologist to introduce the use of dry treatment for cereals against smut. He found that copper carbonate at the rate of 2 oz. per bushel was quite effective for this purpose. Copper carbonate is still used, though the organic mercury dusts are also available for the same purpose.

Organic mercury dusts have the advantage of not interfering with the run of the seed through the drill; also, they are slightly volatile and their effectiveness increases if the seed is stored for a day after treatment. This is a considerable advantage in the case of seeds which are covered with a permanent husk. Such seeds as barley and oats are not effectively protected from smut by copper carbonate, as this does not reach the spores protected by the husk. Prior to the use of organic mercurials, the volatile liquid fungicide formalin had to be used to kill the spores. It is now found that the organic mercury dusts achieve this purpose.

The most recent development in seed treatment is the use of non-metallic dusts—that is, organic fungicides containing neither copper nor mercury. Of these, Spergon and Tetroc are most widely used, mostly on peas and beans. They have shown no advantages so far as cereals are concerned.

Methods of application of dusts on cereals have undergone considerable modification since they were first used. The use of devices such as the barrel mixer has given place to running the dust in during continuous grading operations. Where farmers own a grader, either individually or co-operatively, and grow their own seed, there is no difficulty in the application of the seed treatment. Similarly, contractors will treat farmers' own seed efficiently when grading it. When farmers purchase graded seed there is a regrettable tendency to neglect seed treatment as there is no need to grade this seed again, excepting to apply a fungicide. The risk of heavy loss from ball smut, however, makes careful farmers even more anxious to treat purchased seed.

Summer Grain Crops.

The winter cereals are not the only ones of which it is desirable to treat the seed. Some varieties of sorghum are affected by smut, hence seed treatment is indicated. It is interesting to note that both sorghums and maize are treated in the U.S.A., largely to improve germination and seedling growth. Conditions differ somewhat in most of the American farming districts in that rainfall is higher, winters are colder, and summer seasons shorter. Summer crops therefore tend to be planted in cold damp soil. Under these circumstances there seems to be little doubt that treatment with organic mercury dust considerably improves the stand and consequently the yield of both sorghums and maize. Careful trials were carried out in Queensland at Lawes, using healthy maize seed, to test the effect of seed treatment on emergence and yield. After a considerable number of years of trial, it was concluded that no advantage was gained under our conditions. It is of no use treating the seed in an attempt to control the worst of our maize diseases, namely cob rot.

Peanuts.

Germination and stand of peanuts have been shown to be very much improved by seed treatment with organic mercury dusts. This has been practised for the last ten years in Queensland. Prior to this period the best variety of peanuts, Virginia Bunch, usually occurred in very poor stands owing to the rotting of seedlings just below the ground or at ground level. This trouble, known as crown rot, is believed to be caused by any one of a number of weakly parasitic fungi which enter the kernel through small injuries. Organic mercury dusts have been found to be effective, if not in completely controlling crown rot, then in allowing a reasonable stand to be obtained.

SEED CERTIFICATION.

Many plant diseases are distributed on planting material, hence it is highly desirable to obtain seeds, tubers, cuttings, or whatever is used for propagation, in a state as free from disease as possible. The state of freedom of seeds, &c., can best be determined by examination of the crop in which they were grown. Examination of the seed, however useful it may be to determine its powers of germination and freedom from weeds, is not a good measure of its freedom from disease. This is particularly so in the case of potato virus diseases. Seed tubers may appear quite sound and still be heavily infected with virus. Consequently the only way to obtain good supplies of seed tubers is to get them from a crop known to be healthy. As a result there have arisen seed certification schemes for potatoes.

These involve the examination of the crop several times during its growing period, the rogueing of infected plants, if there are not many, and inspection and careful labelling of the bagged tubers. If more than a certain small percentage of diseased plants are present the crop is rejected.

In Queensland we are dependent on the southern States for annually replenishing our seed potato stocks. Fortunately good seed certification schemes are well established in some of these States and we are able to obtain seed which has reduced considerably the losses from virus disease. This does not entirely apply to losses from other diseases, such as scab, which are both seed- and soil-borne. Seed treatment is available to minimise the amount of scab in a crop and consequently in the seed certification schemes inspectors are not so severe on the presence of a small amount of this disease. There is no seed treatment available for elimination of virus diseases from potato tubers.

Seed certification is being extended from potatoes to other crops, for example grain sorghum, and is a highly desirable development for the future. It should be noted that elimination of diseases is not the only advantage of seed certification. It is an admirable opportunity for insisting on varietal purity and for the development of high yielding strains.

CROP ROTATION.

The disease control aspects of crop rotation are probably of secondary importance to its generally beneficial agronomic effect. However, the reduction of disease following this practice is by no means unimportant.

Maize.

The most serious maize disease is cob rot. It accumulates in maize debris in the ground and is carried over from one season to the next in this debris; hence it is obvious that crop rotation should play an important part in the reduction of this disease. It is not so widely known that crop rotation is also desirable for the reduction of maize smut, which lives over in the soil.

An interesting sidelight on the influence of machinery on diseases occurs in the case of cob rot. Harvesting machinery to obviate the traditional hand pulling and threshing of corn is rather bulky and extensive. Consequently farmers who have obtained this harvesting machinery at considerable capital outlay attempt to justify it by planting larger areas of maize. As a result, a bigger proportion of the farm is planted to this crop and it is much more difficult to practice crop rotation. Under these circumstances cob rot appears to be on the increase where such machinery is being introduced. It is not only the debris in the immediate paddock which affects cob rot incidence; the remains of a maize crop blown from adjacent paddocks also has a big influence on the amount of disease.

Wheat.

On the Darling Downs wheat is usually grown more or less continuously. Quite good crops have been produced year after year on some of the best Downs soils. The limiting factor to this practice in Queensland appears to be weed growth rather than soil exhaustion or accumulation of diseases. This is in contrast to other wheat-growing areas, where take-all and root rots soon accumulate if wheat is grown too frequently on the same land.

In one area on the Downs root rot appears to have been increasing during the last few years. It can be kept in control by good rotational practices. However, as wheat is the most suitable crop for the area, further investigations are being made to see if a deficiency accounts for this more or less isolated occurrence.

Peanuts.

It has already been stated that seed treatment for obviating crown rot of peanuts is effective but does not give complete control. For germination of peanuts, as with other seeds, it is highly desirable that there should be plenty of humus in the soil. The amount of humus also appears to have a direct effect on the amount of crown rot occurring. Cropping to peanuts is a very serious factor in the removal of humus from the soil. When harvested, the whole of the plant, including most of the root, is carried away from the place in which it was grown, very little being returned to the soil. This results in a very much depleted soil. Rotation to maize or other annual crops is quite beneficial but, to get the best results, it has been found that a few years under grass is necessary. It is interesting to note that, in the control of crown rot, the accumulation of humus in the soil is more important than the elimination of diseased peanut material.

A typical instance which supports that contention very strongly will be described. In badly overcropped peanut land a rain only just sufficient to germinate the seed was received. The paddock was planted, with very poor results. An adjoining paddock, in which crops had been rotated and in which remains of maize stalks were to be seen, germinated well with very little crown rot. In the bad paddock the only place where the peanuts germinated well was the site of the old peanut stack. In this area there would have been very much more infective material of the crown rot fungi but, owing to the presence of abundant humus, the kernels germinated well. Where there was little humus, and presumably lesser quantities of infective material, there was practically no survival of seedlings.

This is, of course, an instance of infection by weak parasites, when the seed has germinated under adverse conditions. Not all parasitic fungi behave in this manner. Irish blight of potatoes and rust of wheat are examples of diseases caused by parasites which appear to have a preference for the most vigorous plants.

APPROVED STRAWBERRY RUNNERS.

The following strawberry growers have satisfied the requirements of the approved strawberry-runner scheme of the Department of Agriculture and Stock. This scheme was initiated in 1947 with a view to arresting the spread of strawberry virus diseases and to improve the quality of strawberry-planting material generally. The growers listed may therefore sell their runners as "approved by the Department of Agriculture and Stock":—

Mr. C. A. Kempnich, Pinklands, via Cleveland.
Mr. R. W. Mitchell, Pinklands, via Cleveland.
Mr. E. W. Rogers, North Coast road, Redcliffe.
Mr. F. Rasmussen, Maroochydore road, Woombye.
Mr. T. Sproul, Maroochydore road, Woombye.
Mr. H. T. C. Gibson, Buderim.
Mr. T. E. Kidd, Buderim.
Mr. W. A. Wood, Image Flat road, Nambour.

Pig Farm Accommodation.

F. BOSTOCK, Officer-in-Charge, Pig Branch.

THERE is no farm animal which is so quickly matured and has so improved with the aid of scientific research as the pig and every effort is being made to produce a carcass that will conform to the requirements of the consuming public.

However, there is but one final objective in the raising and marketing of pigs: that objective is to make money by the conversion of a variety of foodstuffs, per medium of the pig's digestive system, into edible pork.

Fortunately the pig is readily able to adapt itself to almost any class of foodstuff, but for best results the food should be of a mixed nature and well balanced in food elements. It must be fed, in sufficient quantities, from sanitary utensils and troughs placed on impervious feeding floors and kept continuously clean.

In providing the necessary accommodation for pigs the farmer must consider the health and comfort of the stock and plan so as far as possible to prevent disease. At the same time he should bear in mind the system of feeding and management it is proposed to adopt.

Climatic influences will play an important part in the class of materials most suitable for any particular district. It is to be expected, for instance, that in a humid and generally damp district decay in certain classes of timber will occur more readily than in drier districts. It is advisable, therefore, for farmers to select materials which will give the maximum service and avoid the necessity of replacements for many years.

In wet districts, muddy yards are often a disturbing, contaminating factor and similarly in dry districts, dry yards. Both have an adverse influence on the health of the stock. In the construction of pens and yards, &c., the farmer should give consideration to safeguards against mud and dust, as well as to drainage of the land and direction of prevailing winds, and set the buildings in such a manner that the stock will be afforded maximum protection.

With a view to assisting and guiding pig farmers in the lay-out of the piggery buildings to the best advantage, plans have been prepared. However, it is not possible for one set plan to suit all cases, but it is possible to indicate the essential items. Also, the industry is controlled by legislation under the Pig Industry Act, Dairy Produce Act, Diseases

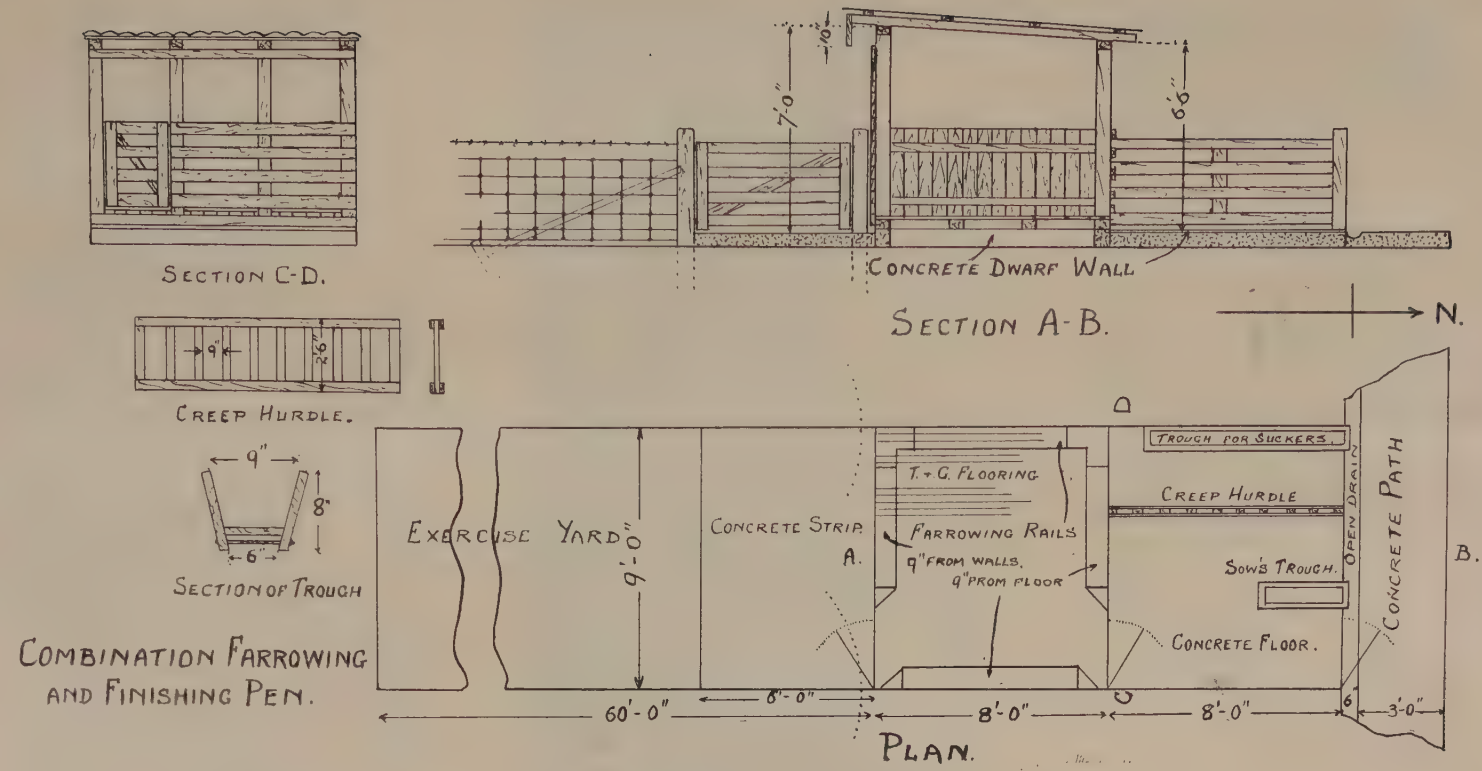


Plate 6.

LAY-OUT OF FARROWING AND FINISHING PENS.

in Stock Act, Slaughtering Act, and the by-laws of city, municipal and shire councils. Therefore, it is recommended, when about to construct or alter a piggery, to consult the authorities concerned, remembering that the general purpose of the legislation is to provide for health and sanitation on the premises where pigs are kept and is not aimed at hindering progress or increasing costs of production.

The most important feature of pig accommodation is sanitation, and bearing this in mind, there are only two systems of keeping pigs which can be expected to give satisfaction—the grazing or open air system, under which pigs are kept on fresh pasture, which is either rested or cultivated and grazed in rotation, and the intensive or indoor system, when pigs are kept on impervious floors which should be properly drained and regularly cleaned. In both systems cleanliness is of first importance, because many of the infections to which pigs are subject may be found on the ground or floor of pig pens which have not been "spelled" or are inconvenient to clean.

Plate 7.
PORTABLE SHEDS, AN ADJUNCT OF ROTATIONAL GRAZING.

When the area available for the piggery is of sufficient size, the grazing system has many advantages and should be practised or, where the area is restricted, adopted in combination with the intensive system which is convenient for sows and litters.

The chief feature of a grazing system is a number of paddocks, varying in size, depending on the class of grazing and number of stock to be carried. Such paddocks should be in sufficient numbers to allow for rotational grazing and resting and, when suitable, cultivation.

When first-class pasture country is available it is usual to allow $\frac{3}{4}$ to 1 acre per sow and progeny; but in drier areas and when it is proposed to produce on the farm all the grain required by the pigs it will be found that, in addition to the acre per sow and progeny for grazing, approximately 10 acres per sow to produce the necessary grain and 10 acres for fallow, making a total of approximately 20 acres per sow and progeny, will be required.

Brood sows will gain the major portion of their food requirements from good pasture or forage crops, but sows and litters must be given a full allowance of concentrated foods even when they have access to good pasture.

Growing pigs on pasture or forage crops secure minerals and vitamins which are frequently lacking under the intensive system; pigs kept under the latter system often suffer from deficiencies, unless the rations fed are properly balanced.

Because the grazing system does not necessitate constant cleaning, labour is saved and pig-raising is more congenial than under the intensive system. It has been demonstrated that under the grazing system pigs can be satisfactorily produced to market weights without the use of finishing pens provided they are bred and fed correctly. The old practice of enclosing pigs in small pens to fatten is gradually disappearing, especially now that the markets are demanding a much leaner and longer pig than was the case years ago.

The cost of accommodation must be taken into account, giving due consideration to the capital available and anticipated returns, but should be calculated on a cost per head basis of each pig likely to be produced in the piggery. Such a cost will usually be found to be low and it is more often than not false economy to save a few pounds in the initial outlay, when such a saving may mean slower growth, greater labour costs and greater risks from disease.

It is estimated that good housing on a small piggery will cost approximately £25 to £35 per sow for capital outlay and this, spread over, say, 15 years and taking into consideration the number of pigs likely to be produced, is a very small part of the total cost of production.

In selecting the site for the piggery the aspect chosen should provide shelter from prevailing winds and at the same time make the maximum use of sunlight, which is the cheapest and best disinfectant. Usually a northerly or north-easterly aspect will be found the most suitable, but drainage away from the piggery is a distinct advantage. Other points which should be borne in mind are water supply, shade, and proximity to cultivation land.

On every farm where pigs are bred and reared a certain number of paddocks or pens are necessary, so that pigs of various classes may be kept separately. Brood sows when dry should be run in separate paddocks from other pigs and it is recommended that forward sows or springers be separated from sows just mated.

Dry sows will secure the greater part of their food requirements from good grazing and give the best results when allowed plenty of exercise and are kept in the open.

Sows and litters are best kept in individual pens with exercise yards attached, but, as it is not always possible to allow each sow and litter an enclosure large enough to be cultivated, the intensive system is usually resorted to. However, sows and litters may be kept separately on pasture by the use of movable pens, such pens being built on skids and providing a shed and exercise yards, the whole unit being moved to fresh pasture as each patch becomes fouled.

All farrowing pens should be fitted with a farrowing or guard rail, placed 9 inches from the floor and 9 inches from the walls, so as to prevent young pigs from being overlaid. When the young pigs are

3 to 4 weeks old they should be fed supplementary foods behind a creep, either by the use of a small self-feeder or in troughs. This system of creep-feeding will greatly assist the young pigs and minimizes setbacks at weaning time. It also relieves the sow of some of the strain of suckling the litter and she is usually in much better condition to be returned to the boar 3 or 4 days after the litter has been weaned.

After weaning, the sow should be returned to the dry sow paddock and the weaners drafted into the grazing paddocks where they should remain until ready for market.

Plate 8.
PALING FENCE FOR ENCLOSING BOAR RUN AND SMALL YARDS.

Fencing.

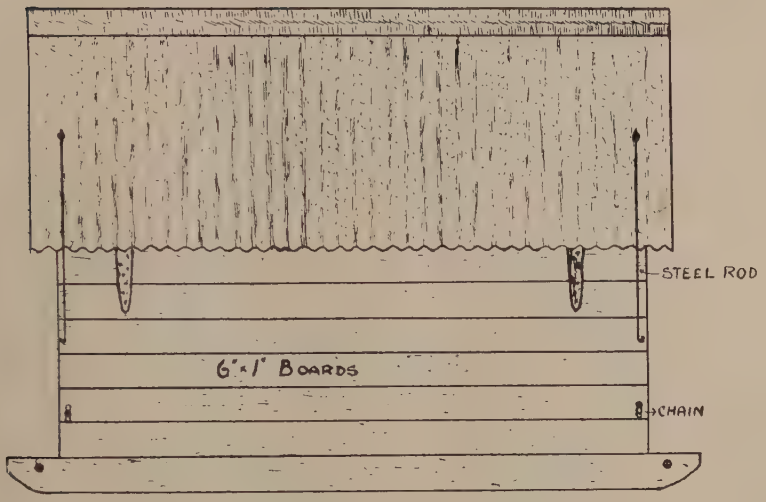
The class of fence to be used will be largely governed by the district and the material available.

Pig fences should be from 3 to 4 feet high, depending upon the class of pig to be enclosed. Sows and boars sometimes have a tendency to jump and for such animals, particularly boars, a 4-foot fence is recommended. However, fences 3 feet high are usually of sufficient height to control pigs of all sizes.

Post-and-rail fences are the best for boar pens and small yards; the material used being split posts and rails or split posts and 6 inch by 1 inch rough-sawn hardwood as rails, fastened to the inside of each post, or sawn hardwood posts may be used.

For grazing areas, special woven-wire pig fencing is usually the best and there are a number of makes on the market which will be found suitable. Heavy-gauge netting may also be used; while seven or eight barbed wires, suitably spaced, is fairly satisfactory but objectionable where young pigs are to be penned.

Where wire fences are used it is a wise practice to construct or reinforce them with wood at the feeding section and gateways as there is the most wear and tear on these parts of the fence.



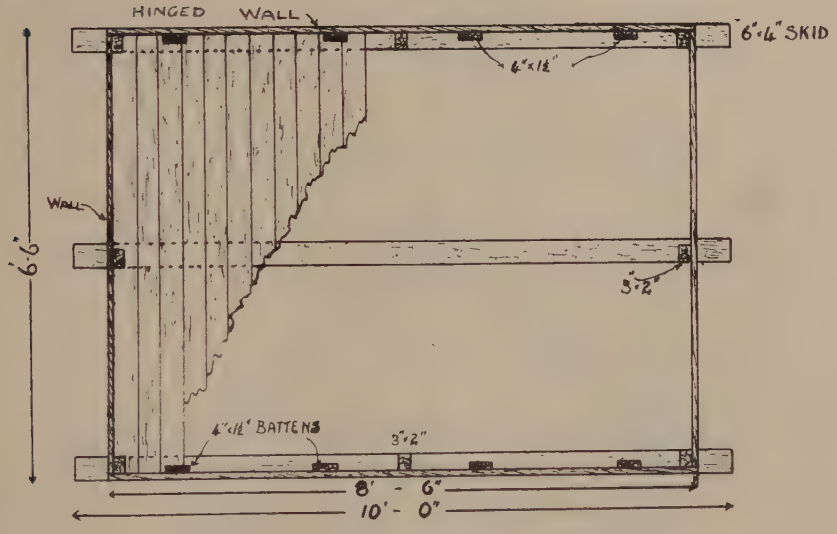
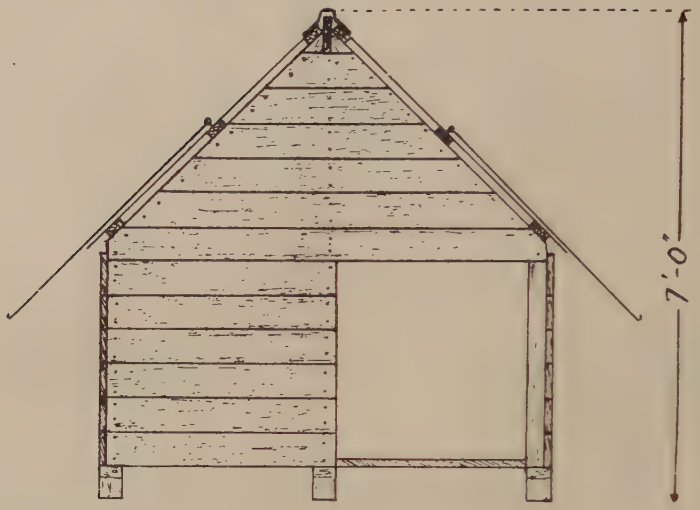
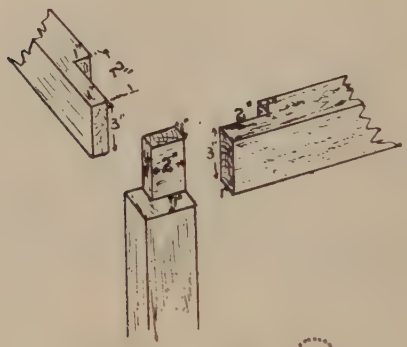


Plate 9.

Plan and Side Elevation of Portable Shed with Hinged Sides. (See Plate 10.)





DETAIL OF JOINT.

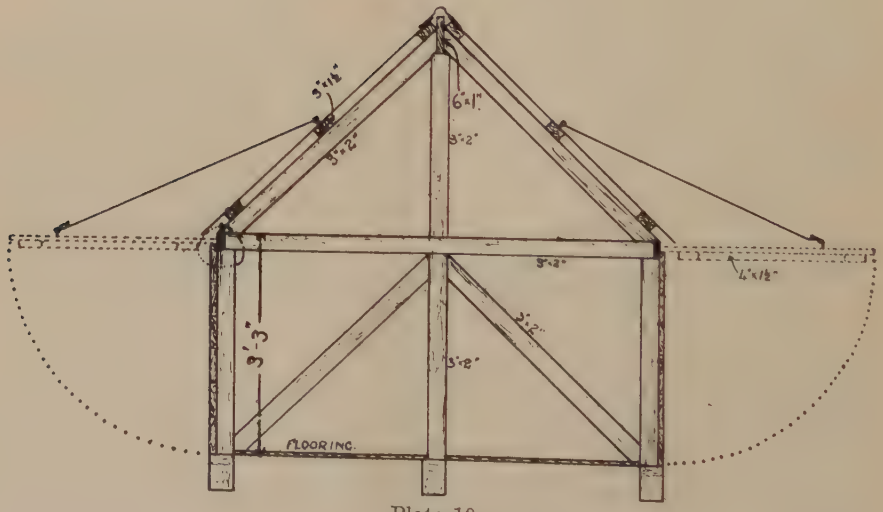


Plate 10.

END ELEVATION AND DETAILS OF PORTABLE SHED WITH HINGED SIDES. (See Plate 9.)

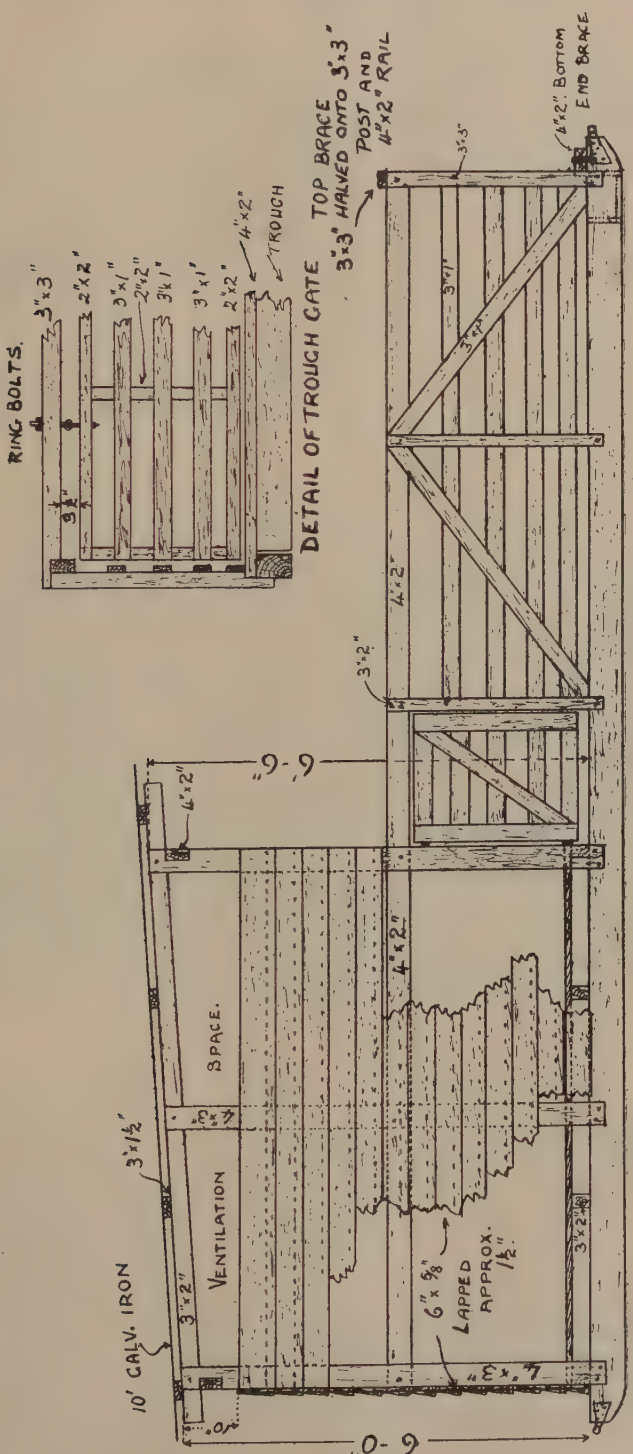
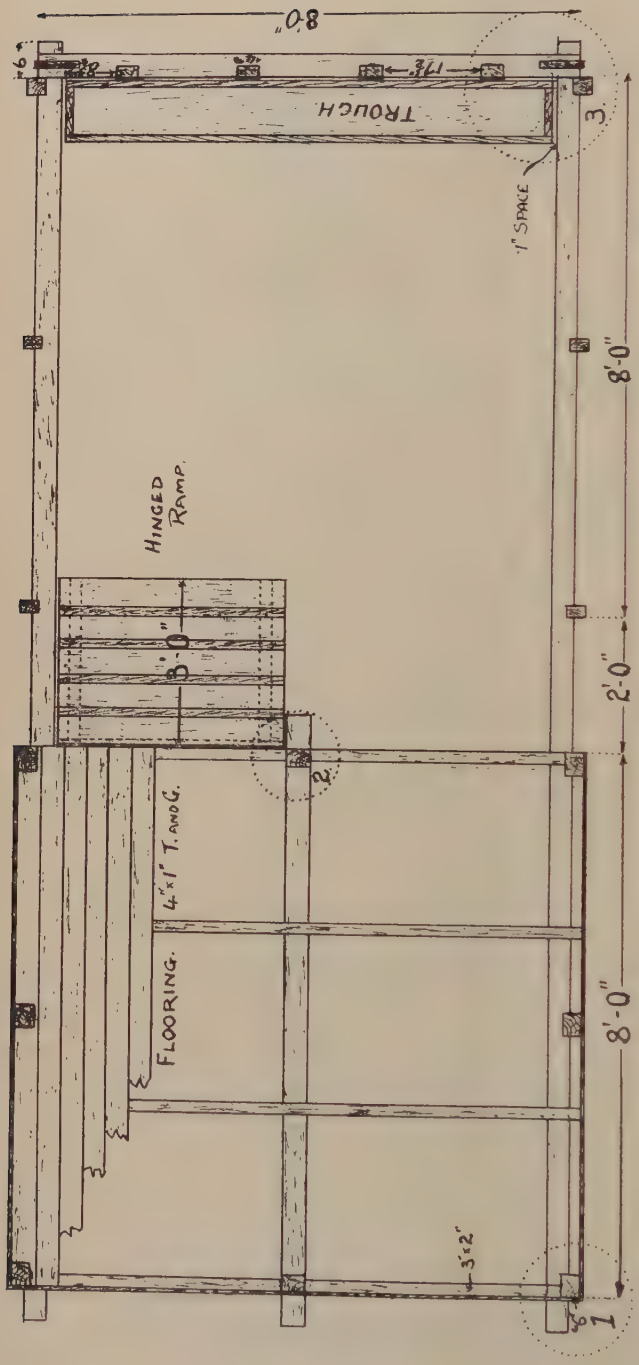
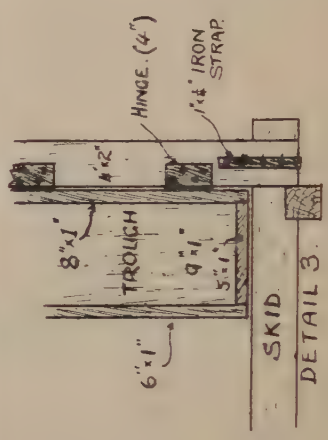
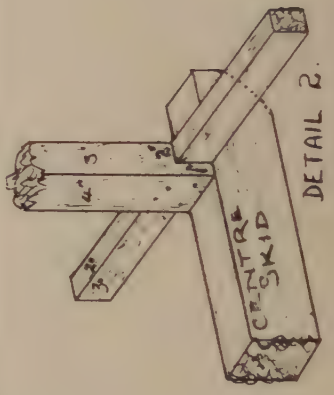


Plate 11.

SIDE ELEVATION OF COMBINED PORTABLE SHED AND RUN. (See Plate 12.)


8'-0"
TROUGH
1" SPACE
3
8'-0"
HINGED RAMP
3'-0"
2'-0"
2
4"x1" T. AND G.
FLOORING.
8'-0"
3"x2"
1


HINGE (4")
1½" IRON STRAP
4"x2"
8"x1"
TROUGH
9"x1"
3"x1"
6"x1"
SKID
DETAIL 3.


4'
3'
3"
CENTRE SKID
DETAIL 2.

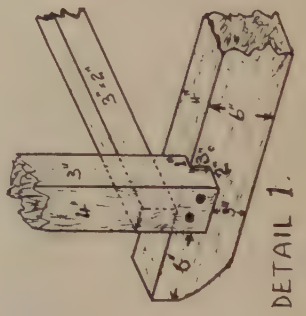

3"x2"
6'
4'
3'
DETAIL 1.

Plate 12.

Floors.

Pigs require sleeping floors that are hygienic, but which in cold weather are warm. As tongue-and-groove timber floors, which are usually recommended, are only reasonably sanitary and durable, consideration should be given to the construction of concrete floors that are in some way insulated against moisture and cold rising from the ground.

Overseas, considerable experimentation and thought has been given to such floors, and the following two methods of construction have been reported to give satisfactory results.

The first of these is the air-cell type, constructed by laying down rows of 4-inch agricultural pipes and covering these with a thin layer of concrete. The effect is to create an air-warmed floor, in which the air trapped in the pipes is warmed each night by the bodies of the sleeping pigs and remains warm for a considerable period, on the same principle as the thermos flask.

Plate 13.

A Paddock of Kikuyu Grass providing Excellent Grazing for Pigs.

The second plan, which is claimed to be cheaper and more efficient, provides for the laying down of a loose rubble base for the purpose of breaking the capillary moisture system from the ground. A system of continuous air-cells embedded in thin concrete is then built by laying down 4-inch half-round wooden mandrels or cores, about 3 feet long, which are embedded in the concrete composed of coke breeze and cement.

As the floor progresses the mandrels are pulled out about 30 inches, thus making a continuous pipe system but without using pipes. Each section is firmly bedded down before withdrawing the mandrels and the ends of the tubular cavities are sealed. The concrete around the mandrels is made of six parts of coke breeze to one part of cement; but the top inch layer to finish the floor is made of a finer breeze and double strength (3 to 1).

Troughs.

A piggery should be equipped with troughs of sufficient capacity to feed the pigs without scrambling and fighting at feeding time, 10 inches to 12 inches of trough space being allowed for each pig.

All troughs should be strongly constructed and have a smooth surface free from cracks and, when a fixture, be surrounded by a feeding floor to prevent the pigs from making mud wallows beside the trough.

Half-round glazed pipes set in concrete or well-finished concrete troughs are best. However, good sawn hardwood well joined, pitched and tarred before being put into use, make very satisfactory troughs; but troughs cut out of a log are not satisfactory, because they split and crack and are impossible to keep in a sanitary condition.

Plate 14.

CONCRETE OR WOODEN FEEDING FLOORS IN A PIGGERY HELP TO KEEP PIGS HEALTHY.

Self-feeders.

Self-feeders are simply devices by means of which a supply of grain or other feeds may be kept constantly available to the pigs in order that they may satisfy the cravings of their appetites.

Self-feeders are practical when grain is being fed and for this purpose are intended for use more especially during the growing and finishing stages in the life of pork and bacon pigs. They are not specially recommended for feeding brood sows.

Of whatever type, they should be designed primarily to keep an available supply of grain constantly before the pigs and at the same time protect the contents against waste due to wind and rain.

A self-feeder consists of a hopper to hold the food and a trough below into which the grain is allowed to flow. The amount permitted to flow into the trough is regulated.

Self-feeders should be placed on a concrete or wooden platform and if well constructed should give satisfactory service for many years. However, a self-feeder is by no means a substitute for a knowledge of

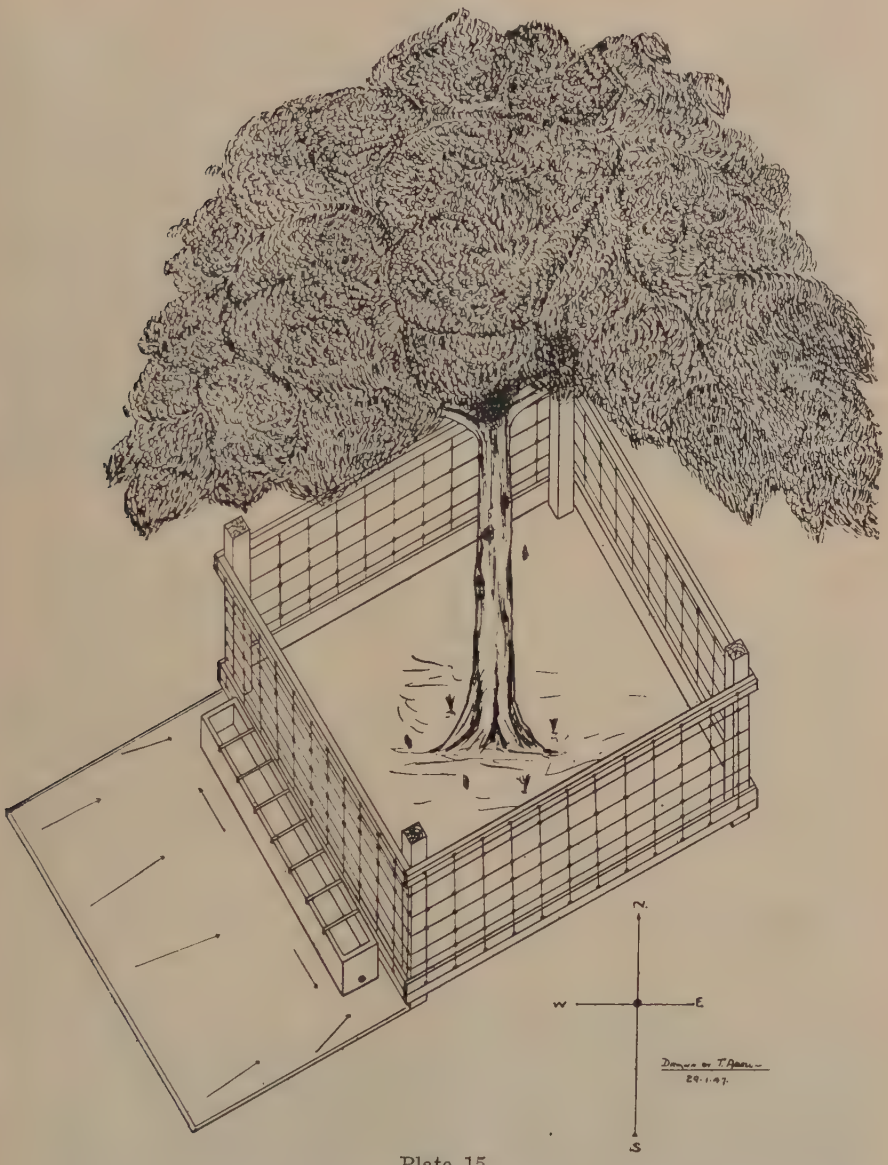


Plate 15.

PLAN OF COMBINED TREE-SHADED AREA AND WATER TROUGH.—A shed may also be built to take advantage of the shade.

feeding and must not be neglected. The old adage, "The eye of the master fattens his cattle," holds good when applied to self-feeding of pigs.

Shade.

Pigs should be provided with ample cool shade in summer and protection from cold winds in winter and this can be done by either planting trees, shrubs, or hedges, or by building a hardwood framework about 4 feet high and covering the top with bushes or thatching with grass.

Concrete.

Concrete floors, &c., in piggeries should be set on good solid foundations and surfaces should be rough-finished to give the pigs a grip and prevent slipping.

To check the action of acid from milk and other foods and to make concrete more waterproof, it may be given three applications of silicate of soda (quartzite) as the concrete is setting. This treatment will prolong the life of concrete floors and troughs. The usual method of application is to mix 1 gallon of silicate of soda with 4 gallons of water and spray or paint it on the concrete when just beginning to set and follow by two other dressings at intervals of about 24 hours.

Loading Race.

Provision should be made for a loading race conveniently placed. It should be approximately 22 inches wide inside measurement, so that pigs are unable to turn round once they have entered the race. Whether the race is a permanent fixture or portable will depend largely upon the lay-out of the farm.

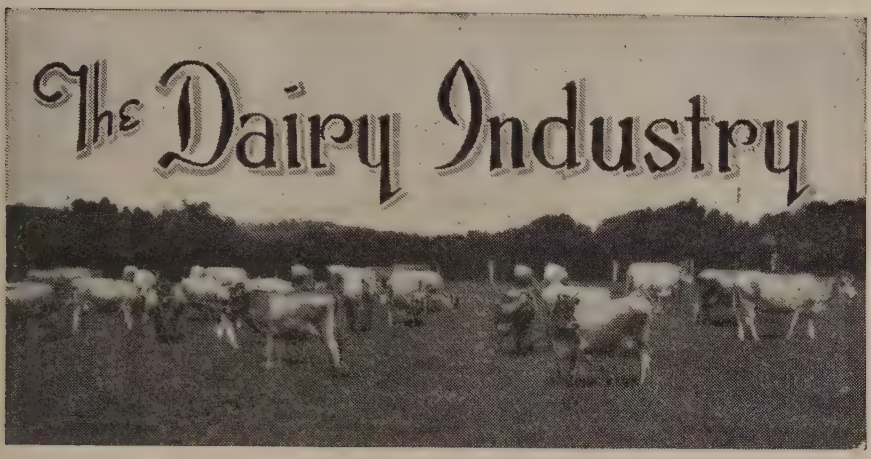
Quarantine Pen.

It is advisable and strongly recommended that every piggery be provided with a quarantine pen, well drained and placed some distance from other pens and yards, where newly introduced pigs and sick pigs can be placed and kept under observation. Such a pen is an important safeguard against outbreaks of disease.

It is desired to acknowledge the valuable assistance given by Mr. T. Abell, Adviser, Pig Branch, Atherton, who drew the plans reproduced in this article.

This article will be published in pamphlet form with a complete set of plans and specifications. Copies, when they become available, may be had on application to the Under Secretary, Department of Agriculture and Stock, Brisbane.

Plate 16.
A "BLOW" FOR THE TEAM.



Queensland Butter Production.

E. B. RICE, Division of Dairying.

IN the year ended 30th June, 1947, factory-made butter aggregated 74,068,021 lb. of an estimated value of £6,069,327. This was the lowest butter output in Queensland since the 1928-1929 season, and was slightly less than half that of the record season of 1938-1939, when 154,377,535 lb. was produced. Although the abnormally dry season was the main cause of the decline in butter output in the season under review in comparison with that of the preceding season, comparisons of butter production for recent years give a false impression of the decline in dairy production. Over a period of years there has been a pronounced diversion of milk to the market milk trade and the cheesemaking and ice cream trades—all at the expense of butter. This is clearly brought out in the following table which was submitted to a recent meeting of the Victorian Division of the Australian Society of Dairy Technology:—

APPROXIMATE PER CAPITA CONSUMPTION OF DAIRY PRODUCTS IN AUSTRALIA.

Product.	Pre-war.		1946.	
	—	Milk galls. Millions.	—	Milk galls. Millions.
Butter	32 lb.	450	26 lb.	370
Cheese	4½ lb.	32	7 lb.	50
Fresh Milk	158 pints	147	200 pints	190
Ice Cream	1 gall.	7	1½ gall.	10
Milk Powder and Milk Products..	3 lb.	20	5 lb.	35
Total		656		655

Grading.

The results of all Queensland butter graded by Commonwealth and State graders are summarized as follows:—

—	Boxes.	Per cent.
Choice grade	332,552	32·46
First grade	612,135	59·75
Second grade	72,503	7·08
Pastry grade	7,303	·71

This quantity represents 77.46 per cent. of the total production. It is thus seen that the grading figures may be expected to give a fair reflection of the quality of Queensland butter.

During the war years emphasis was placed on increasing the volume of dairy production rather than on maintaining quality. While the need still exists for increasing production in order to meet the needs of food-hungry nations, it is equally necessary to strive to produce butter of uniformly high quality. The marked downward trend of butter quality in recent years is greatly to be deplored. Action to arrest this decline is urgently necessary. In this regard, the full co-operation of the advisory services of the Division of Dairying are available; but success can only be achieved by the united efforts of all sections of the industry.

In the butter factories the deterioration of factory equipment, through the inability in recent years to carry out normal maintenance and effect renewals, is partly to be blamed for lowered butter quality. This factor is, however, considered of much lesser significance than the declining quality of cream supplies and the tendency among factories to a lenient grading of cream. Some factories fail to realize their obligation to adhere to cream-grading standards. This is evident from the percentage of butter which is not passed by Commonwealth and State graders as true to the quality packed. Naturally, any farmer who is credited with choice grade for cream not of that quality is falsely led to believe his shed methods are satisfactory. This shortsighted policy does a serious disservice to the industry. It hinders departmental efforts to assist in the improving of cream supplies, as borderline suppliers will show their factory cream-grade dockets as evidence of taking the requisite care to produce sound-quality cream. It is, too, directly opposed to what must be the ultimate objective of the Australian dairy industry—butter of one uniform quality comparable at least with that of its chief competitors.

Farm Refrigerators.

In connection with quality improvement, the efforts of the Queensland Butter Board to foster the use of refrigerators for cooling milk and cream on dairy farms are deserving of commendation. The Board has set up a refrigerator manufacturing department and is now assembling units for supply to dairy farmers at cost price. A long-term hire-purchase plan will enable any dairyman to instal a refrigerator on a low deposit and to repay the purchase price over an extended period. The ordinary milking-machine engine provides the motive power.

Weed Taints.

Field officers of the Division have co-operated with officers of the Council for Scientific and Industrial Research in investigations commenced in the course of the year on weed taints in dairy produce. These taints have caused heavy degrading of butter in recent years.

Officers of the C.S.I.R. are carrying out feeding trials at the Queensland Agricultural College with some of the more widely occurring weeds. Modifications in manufacturing technique, especially lower pasteurizing temperatures, will also be carried out, with a view to ascertaining if the intensity of taint can be minimized.

Mottles.

This defect was again prevalent in the output of some factories. The whole subject of body and texture of butter and its relationship to keeping quality is being investigated in the Dairy Research Branch. The findings should be of great practical and economic value. It is fairly clear from experimental work in factories during the year that mottling most commonly, if not always, occurs in butter in which, through insufficient working, the moisture droplets are large. The existence of mottles has not been observed in well-worked butter in which, because of effective working, moisture droplets have been finely dispersed. By careful control of churning temperature, size of butter granule, complete draining at the grain stage and adequate working, the buttermaker should be able to avoid mottling in the resultant butter.

Streaky Butter.

This defect was a cause of some degrading. With the large modern churns of up to 100 boxes capacity, butter may remain longer in the churn room before packing. Consequently, there is some risk of the exposed surface of the butter becoming softened in the summer months and, when put through the butter packer, causing a streaky condition throughout the mass. Temperature-controlled packing rooms are desirable in the Queensland climate.

New Ways of Making Butter.

Much interest is being evinced in the several new processes for making butter developed during the war years in several countries, including the Australian "New Way" process. These methods dispense with the churn, the age-old means of changing cream into butter, and seem better adapted to the handling of milk and fresh or "sweet" cream, rather than self-ripened, or sour, cream. Because of sparse settlement, road condition and climate, "sour" cream is at present received at all Queensland factories. One of the new machines, developed by Dr. Senn of the Dairy Research Institute in Switzerland, does, however, treat sour cream. To determine the suitability under Australian conditions of these machines, which are based on three different underlying principles, the Australian Dairy Produce Board has arranged for the purchase of four machines which will be installed in factories in Victoria, New South Wales and Queensland. A technical committee has been appointed to supervise the trials. The Senn machine, already mentioned, will be placed in the Caboolture butter factory in this State.

Butter Improvement Service.

As in former years, the Butter Marketing Board has made a grant of £1,000 towards the cost of laboratory services. Field officers of the Division co-operated fully in providing the necessary liaison between the laboratory and the factories in regard to the Butter Improvement Service.

Imperial Contract and Commonwealth Government Subsidies.

As from 1st July, 1946, the contract price of butter exported to the United Kingdom was raised to 216s. 10½d. per cwt. The contract between the British and Australian governments lasts until 30th June, 1948. Negotiations in connection with the renewal of the contract will possibly be opened when the report of the Dairy Industry Costs Committee is received. Representatives of the industry believe the contract will continue until at least 1950.

The present price, including Commonwealth Government subsidy, expected to return to the producer 1s. 7½d. per lb. commercial butter, was to be reviewed after 31st March, 1947, and the Commonwealth Government has guaranteed the industry that the price for the year ending 31st March, 1948, will not fall below the average price which operated in 1945.

A matter of major interest in relation to the view of prices to be paid producers from April, 1947, was the setting up of a Joint Dairying Industry Committee consisting of representatives of the Commonwealth Government and dairy industry organizations. The Committee is charged with investigating the costs of production of dairy produce. For this purpose, about 1,050 random-selected dairy farms throughout Australia will be thoroughly surveyed. These farms, representing about 1 to 1.5 per cent. of all suppliers to butter, cheese and milk-processing plants, will each be visited by two officers, one nominated by producers and one by the Government. Three hundred and seventy-five Queensland farms are included in the costing survey. Several officers of the Division of Dairying are associated with the Committee in connection with the work to be done in Queensland. It is expected to complete the collection of data from farms by the end of June and the Committee's report on its findings should be placed before the Commonwealth Government soon afterwards. This survey should provide reliable data on dairy-farm production costs. Moreover, certain other data being collected simultaneously with the cost-of-production data should provide factual information on many other aspects of farm management in Australia.

The long-term contract for the sale of the exportable surplus of dairy produce gives a measure of marketing stability never previously known in the Australian dairy industry. Prices of dairy farms are buoyant, indicative of the faith of dairy farmers in the future prospects of the industry.

During the war years and since, all butter distributed in England bore no other description than "National Butter." As from 1st October, 1947, it is now permissible to mark on the wrapper the brand name and country of origin of the butter, in addition to the words "National Butter." The amendment of the Regulations to permit of this new

system of marking was made in response to representations from some of the countries which always marked the country of origin on their produce in pre-war years. This announcement suggests a definite trend back to pre-war methods of marketing in Britain.

The position in respect of Commonwealth Government subsidy to the Australian dairy industry is summarized hereunder:—

Year.	Return to Producer per lb. Commercial Butter.	Return to Producer per lb. Butterfat basis.	Subsidy required and paid by the Commonwealth.	Recoupment from British Government.	Nett cost to the Commonwealth Government.
	s. d.	*s. d.*	£	£	£
1942–43 ..	1 5½	1 9·27	1,186,306	..	1,186,306
1943–44 ..	1 6	1 9·88	7,346,120	1,439,579	5,906,541
1944–45 ..	1 7·3	1 11·458	6,812,197	2,693,191	4,119,006
1945–46 ..	1 7½	1 11·7	6,373,511	1,654,692	4,718,819
1946–47 ..	1 7½	1 11·7	6,250,000	estimated	6,250,000
			27,968,134	5,787,462	22,180,672

QUEENSLAND BUTTER PRODUCTION.

SUMMARY OF PRODUCTION AND GRADINGS OF BUTTER FOR THE YEAR ENDED 30TH JUNE, 1947.

MANUFACTURE IN LB.

Total.	Choice.	First.	Second.	Pastry.
74,068,021	44,948,166	26,247,252	2,859,760	12,843

PAY IN LB.

74,270,061	46,154,441	25,646,186	2,467,679	1,755

OVER-RUN.

Actual .. .. .. 2,316,431 = 3·22 per cent.
Paid .. .. .. 2,395,493 = 3·33 per cent.

Butter Submitted for Grading.		Grading Result.			
Grade.	No. of Boxes.	Choice.	First.	Second.	Pastry.
Choice	553,044	332,552	219,258	1,117	117
First	422,599	..	392,877	29,500	222
Second	48,425	..	..	41,886	6,539
Pastry	425	..	..	..	425
Totals	1,024,493	332,552 32·46%	612,135 59·75%	72,503 7·08%	7,303 ·71%

Percentage of Production Graded = 77·46 per cent.

PRODUCTION, PAYMENTS, AND GRADINGS OF BUTTER IN QUEENSLAND, FOR THE YEAR ENDED 30TH JUNE, 1947

Factory.		Manufacture and Payments in Lb.					Over-run.		Make Graded.
		Total.	Choice.	First.	Second.	Pastry.	Actual.	Paid.	Per Cent.
Atherton	Make	1,258,207	1,258,207	..	..	..	46,795	53,340	6·88
	Pay	1,264,752	1,261,494	..	3,258	..	3·86%	4·4%	
Bushy Creek	Make	6,848	6,848	..	..	..	U/r. 2	46	..
	Pay	6,896	6,896	..	..	..	..	·67%	
Caboolture	Make	1,414,828	1,218,396	196,432	..	..	65,559	59,304	65·85
	Pay	1,408,573	1,267,892	138,969	1,712	..	4·86%	4·4%	
Eumundi	Make	1,476,493	1,340,330	135,966	197	..	46,572	45,484	84·17
	Pay	1,475,405	1,361,989	113,282	134	..	3·26%	3·18%	
Pomona	Make	1,123,643	1,086,340	37,303	..	..	32,539	33,121	92·62
	Pay	1,124,225	1,110,005	13,920	300	..	2·98%	3·04%	
Chinchilla	Make	1,046,712	712,672	239,568	83,384	11,008	18,527	21,555	91·15
	Pay	1,049,740	728,364	249,809	70,761	806	1·81%	2·10%	
Daintree	Make	78,191	78,191	..	..	..	××	..	..
	Pay	84,157	84,157	..	..	..	..	..	
Dayboro	Make	42,019	15,260	26,759	..	..	××	..	..
	Pay	181,442	156,278	25,164	..	..	..	..	
Toowoomba	Make	2,002,728	1,546,552	336,336	119,840	..	65,704	65,704	49·59
	Pay	2,002,728	1,532,286	349,210	121,232	..	3·39%	3·39%	
Clifton	Make	1,108,352	813,792	293,664	896	..	31,741	31,716	95·74
	Pay	1,108,327	814,960	292,502	865	..	2·95%	2·95%	

OFFICIAL GRADINGS IN BOXES.

Factory.	Boxes Submitted As Choice.	Grading Result.				Boxes Submitted As First.	Grading Result.			Boxes Submitted As Second.	Grading Result.		Pastry Quality.
		Choice.	First.	Second.	Pastry.		First.	Second.	Pastry.		Second.	Pastry.	
Atherton ..	1,525	1,525 100%	..	..	..	..	..	..	..	20	20 100%	..	..
Bushy Creek ..	..	..	..	..	..	..	..	..	..	..	..	..	..
Caboolture ..	13,016	7,358 56·53%	5,658 43·47%	..	..	3,618	2,713 74·99%	905 25·01%	..	2	2 100%	..	..
Eumundi ..	19,882	3,935 19·79%	15,800 79·47%	147 ·74%	..	2,303	978 42·47%	1,318 57·23%	7 ·3%	6	6 100%	..	..
Pomona ..	17,906	7,980 44·57%	9,926 55·43%	..	..	678	389 57·37%	289 42·63%	..	..	..	..	..
Chinchilla ..	11,084	6,261 56·49%	4,798 43·29%	25 ·22%	..	4,278	3,078 71·95%	1,200 28·05%	..	1,447	1,229 84·93%	218 15·07%	228
Daintree ..	..	..	..	..	..	..	..	..	..	..	..	..	..
Dayboro ..	..	..	..	..	..	..	..	..	..	..	..	..	..
Toowoomba ..	10,771	9,470 87·92%	1,301 12·08%	..	..	5,969	5,846 97·94%	123 2·06%	..	994	936 94·16%	58 5·84%	..
Clifton	13,651	12,386 90·73%	1,265 9·27%	..	..	5,282	5,275 99·87%	7 ·13%	..	16	16 100%	..	..

PRODUCTION, PAYMENTS, AND GRADINGS OF BUTTER IN QUEENSLAND, FOR THE YEAR ENDED 30TH JUNE, 1947—*continued.*

Factory.	Manufacture and Payments in Lb.					Over-run.		Make Graded.
	Total.	Choice.	First.	Second.	Pastry.	Actual.	Paid.	Per Cent.
Crow's Nest	Make 1,224,048	748,608	463,680	11,760	..	37,075	37,106	96·05
	Pay 1,224,079	748,878	464,398	10,803	..	3·12%	3·13%	
Dalby	Make 1,751,182	656,886	1,017,016	74,256	3,024	61,564	61,498	78·62
	Pay 1,751,116	649,372	1,040,641	61,103	..	3·64%	3·64%	
Goombungee	Make 1,169,840	519,848	606,368	43,624	..	32,875	32,853	97·2
	Pay 1,169,818	520,872	605,711	43,235	..	2·89%	2·89%	
Jandowae	Make 1,325,293	481,656	752,301	91,336	..	38,823	38,823	95·64
	Pay 1,325,293	481,659	752,330	91,304	..	3·02	3·02%	
Miles	Make 507,808	45,136	284,536	178,136	..	13,176	13,191	73·43
	Pay 507,823	45,151	284,644	178,028	..	2·66%	2·67%	
Esk	Make 1,967,785	806,647	1,097,553	63,585	..	40,915	41,564	96·46
	Pay 1,968,434	820,609	1,093,469	54,356	..	2·12%	2·16%	
Evelyn Tableland ..	Make 307,416	307,416	..	..	..	10,424	10,387	14·12
	Pay 307,379	306,593	257	529	..	3·51%	3·5%	
Gayndah	Make 1,082,510	649,518	411,712	21,280	..	39,081	39,195	94·24
	Pay 1,082,624	647,606	416,432	18,586	..	3·75%	3·76%	
Killarney	Make 1,363,366	1,085,701	224,073	53,592	..	30,075	29,905	73·41
	Pay 1,363,196	755,576	550,941	56,679	..	2·26%	2·24%	
Logan and Albert ..	Make 2,658,964	2,188,950	462,902	7,112	..	133,224	133,684	92·37
	Pay 2,659,424	2,243,869	409,110	6,445	..	5·28%	5·29%	

OFFICIAL GRADINGS IN BOXES—*continued.*

Factory.	Boxes Submitted As Choice.	Grading Result.				Boxes Submitted As First.	Grading Result.			Boxes Submitted As Second.	Grading Result.		Pastry Quality.
		Choice.	First.	Second.	Pastry.		First.	Second.	Pastry.		Second.	Pastry.	
Crow's Nest ..	12,489	9,491 75·99%	2,998 24·01%	..	..	8,295	7,887 95·08%	408 4·92%	..	210	210 100%	..	..
Dalby	7,752	6,525 84·17%	1,227 15·83%	..	..	15,507	14,720 94·92%	787 5·08%	..	1,292	1,040 80·5%	252 19·5%	34
Goombungee ..	8,946	6,138 68·61%	2,808 31·39%	..	..	10,583	10,090 95·34%	493 4·66%	.. ..	777	459 59·08%	318 40·92%	..
Jandowae ..	7,718	5,354 69·37%	2,364 30·63%	..	..	13,286	12,951 97·48%	335 2·52%	..	1,630	1,287 78·96%	343 21·04%	..
Miles	20	20 100%	..	..	..	4,010	3,256 81·2%	737 18·38%	17 ·42%	2,629	1,625 61·81%	1,004 38·19%	..
Esk	13,045	9,264 71·02%	3,781 28·98%	..	..	19,426	18,560 95·54%	866 4·46%	..	1,425	1,068 74·95%	357 25·05%	..
Evelyn Tableland	126	126 100%	..	..	..	636	636 100%	..	..	..	..	..	13
Gayndah ..	10,601	6,563 51·91%	3,945 37·21%	93 ·88%	.. ..	7,254	5,974 82·35%	1,273 17·55%	7 ·1%	363	323 88·98%	40 11·02%	..
Killarney ..	7,310	5,853 80·07%	1,457 19·93%	..	..	9,399	9,339 99·36%	60 ·64%	..	1,163	1,063 91·4%	100 8·6%	..
Logan and Albert	36,911	15,100 40·91%	21,659 58·68%	152 ·41%	..	8,374	6,107 72·93%	2,267 27·07%	..	127	83 65·35%	44 34·65%	..

PRODUCTION, PAYMENTS, AND GRADINGS OF BUTTER IN QUEENSLAND, FOR THE YEAR ENDED 30TH JUNE, 1947—*continued.*

Factory.		Manufacture and Payments in Lb.					Over-run.		Make Graded.
		Total.	Choice.	First.	Second.	Pastry.	Actual.	Paid.	Per Cent.
Maleny	Make	1,668,513	1,581,321	85,568	1,624	..	48,418	49,218	90·54
	Pay	1,669,313	1,597,852	67,798	3,663	..	2·99%	3·04%	
Maryborough	Make	579,731	408,422	154,369	16,940	..	××	..	23·70
	Pay	585,149	410,780	157,598	16,771	..	..	..	
Biggenden	Make	1,258,971	788,179	470,792	..	..	62,659	55,738	80·89
	Pay	1,252,050	823,840	428,184	26	..	5·24%	4·66%	
Kingaroy	Make	2,735,872	2,518,592	123,872	93,408	..	139,984	123,901	50·29
	Pay	2,719,789	2,525,679	110,509	83,601	..	5·39%	4·77%	
Mundubbera	Make	1,383,954	1,142,818	184,520	56,616	..	53,461	53,090	88·21
	Pay	1,383,583	1,176,281	167,401	39,901	..	4·02%	3·99%	
Wondai	Make	1,581,870	990,664	538,216	52,990	..	66,017	63,095	76·32
	Pay	1,578,948	1,055,427	485,426	38,095	..	4·36%	4·16%	
Millaa Millaa	Make	596,985	596,985	..	..	..	19,819	18,433	9·17
	Pay	595,599	595,599	..	..	..	3·43%	3·19%	
Milmerran	Make	1,104,297	302,153	641,032	161,112	..	26,808	26,944	93·17
	Pay	1,104,433	319,191	657,977	127,265	..	2·49%	2·5%	
Nanango	Make	1,974,892	559,492	1,349,936	65,464	..	64,273	64,592	94·9
	Pay	1,975,211	697,491	1,227,618	50,102	..	3·36%	3·38%	
Oakey	Make	2,765,328	2,233,720	346,696	184,912	..	83,991	83,644	90·99
	Pay	2,764,981	2,227,588	390,273	147,120	..	3·13%	3·12%	

OFFICIAL GRADINGS IN BOXES—*continued.*

Factory.	Boxes Submitted As Choice.	Grading Result.				Boxes Submitted As First.	Grading Result.			Boxes Submitted As Second.	Grading Result.		Pastry Quality.
		Choice.	First.	Second.	Pastry.		First.	Second.	Pastry.		Second.	Pastry.	
Maleny ..	25,406	11,865 46·7%	13,541 53·3%	..	..	1,541	1,401 90·91%	140 9·09%	..	29	29 100%	..	..
Maryborough ..	443	122 27·54%	321 73·46%	..	..	1,711	1,086 63·47%	625 36·53%	..	300	85 28·33%	215 71·67%	..
Biggenden ..	10,128	5,851 57·77%	4,277 42·23%	..	..	8,057	7,321 90·87%	736 9·13%	..	1	1 100%	..	..
Kingaroy ..	20,794	18,809 90·45%	1,958 9·55%	..	..	2,212	2,212 100%	..	..	1,563	1,393 89·12%	170 10·88%	..
Mundubbera ..	17,705	5,615 31·71%	11,907 67·26%	183 1·03%	..	3,256	1,469 45·12%	1,787 54·88%	..	839	493 58·76%	346 41·24%	..
Wondai ..	11,206	9,472 84·53%	1,731 15·45%	..	3 ·02%	9,563	9,136 95·53%	427 4·47%	..	791	766 96·84%	25 3·16%	..
Millaa Millaa ..	736	736 100%	..	..	..	212	212 100%	..	..	30	30 100%	..	..
Milmerran ..	3,999	3,118 77·97%	881 22·03%	..	..	11,483	10,625 92·53%	818 7·12%	40 ·35%	2,880	2,437 84·62%	443 15·38%	11
Nanango ..	8,379	6,951 82·96%	1,428 17·04%	..	..	23,895	23,565 98·62%	289 1·21%	41 ·17%	1,195	1,086 90·88%	109 9·12%	..
Oakey	35,467	19,754 55·7%	15,713 44·3%	..	..	6,183	6,102 98·69%	81 1·31%	..	3,283	3,283 100%	..	..

PRODUCTION, PAYMENTS, AND GRADINGS OF BUTTER IN QUEENSLAND, FOR THE YEAR ENDED 30TH JUNE, 1947—*continued.*

Factory.		Manufacture and Payments in Lb.					Over-run.		Make Graded.
		Total.	Choice.	First.	Second.	Pastry.	Actual.	Paid.	Per Cent.
Bundaberg	Make	1,092,915	399,604	693,311	..	..	22,186	24,859	54·94
	Pay	1,095,588	408,499	686,689	239	161	2·07%	2·32%	
Gladstone	Make	799,673	159,820	639,437	416	..	19,684	21,286	67·45
	Pay	801,275	207,247	593,564	464	..	2·52%	2·73%	
Mackay	Make	242,031	54,527	185,891	1,426	187	××	..	..
	Pay	247,825	59,808	186,506	1,242	269	..	..	
						..			
Monto	Make	1,831,975	669,064	1,098,104	64,807	..	××	..	66·42
	Pay	1,841,803	776,436	1,003,692	61,675	..	..	..	
Rockhampton	Make	988,870	102,385	859,215	27,270	..	..	..	9
	Pay	1,000,770	102,860	871,586	26,324	..	..	..	
Wowan	Make	1,635,429	404,624	1,207,549	23,256	..	35,714	40,598	69·4
	Pay	1,640,313	413,967	1,208,285	18,061	..	2·23%	2·54%	
Biloela	Make	2,368,134	518,862	1,785,768	63,504	..	60,409	62,563	59·19
	Pay	2,370,288	565,448	1,750,211	54,629	..	2·62%	2·71%	
Q.A.H.S. and College ..	Make	51,113	43,553	7,560	..	..	781	809	·21
	Pay	51,141	49,017	1,965	159	..	1·34%	1·61%	
Boonah	Make	3,448,484	1,289,243	1,843,935	315,250	56	131,232	131,118	96·76
	Pay	3,448,370	1,419,168	1,775,565	253,637	..	3·96%	3·95%	
Booval	Make	2,937,231	1,355,861	1,308,496	272,818	56	74,523	79,098	71·94
	Pay	2,942,248	1,222,738	1,489,937	229,573	..	2·60%	2·76%	

OFFICIAL GRADINGS IN BOXES—*continued.*

Factory.	Boxes Submitted As Choice.	Grading Result.				Boxes Submitted As First.	Grading Result.			Boxes Submitted As Second.	Grading Result.		Pastry Quality.
		Choice.	First.	Second.	Pastry.		First.	Second.	Pastry.		Second.	Pastry.	
Bundaberg ..	948	786 82·91%	162 17·09%	..	..	9,774	9,534 97·54%	240 2·46%	..	..	..	..	..
Gladstone ..	550	550 100%	..	..	..	9,082	9,030 99·43%	52 ·57%	..	..	..	..	..
Mackay ..	..	..	..	..	..	..	..	..	..	..	..	..	..
Monto	6,017	4,213 70·02%	1,804 29·98%	..	..	14,418	13,966 96·87%	452 3·13%	..	1,292	1,118 86·53%	174 13·47%	..
Rockhampton ..	..	..	..	..	..	1,391	1,333 95·83%	58 4·17%	..	71	71 100%	..	127
Wowan ..	3,538	3,154 89·15%	384 10·85%	..	..	16,340	14,865 90·97%	1,475 9·03%	..	391	108 27·62%	283 72·38%	..
Biloela	2,243	2,064 92·02%	178 7·94%	1 ·04%	..	21,906	21,829 99·65%	77 ·35%	..	882	565 64·06%	317 35·94%	..
Q.A.H.S. and College	..	..	..	..	..	108	81 75·0%	27 25·0%	..	..	..	..	..
Boonah	21,320	6,078 28·51%	15,044 70·56%	100 ·47%	98 ·46%	32,776	31,132 94·98%	1,644 5·02%	..	5,486	5,309 96·77%	177 3·23%	..
Booval	9,408	6,111 64·96%	3,297 35·04%	..	..	23,601	21,959 93·04%	1,642 6·96%	..	4,726	4,532 95·90%	194 4·10%	..

PRODUCTION, PAYMENTS, AND GRADINGS OF BUTTER IN QUEENSLAND, FOR THE YEAR ENDED 30TH JUNE, 1947—*continued.*

Factory.		Manufacture and Payments in Lb.					Over-run.		Make Graded.
		Total.	Choice.	First.	Second.	Pastry.	Actual.	Paid.	Per Cent.
Grantham	Make	1,853,781	510,636	1,131,473	211,672	..	59,823	56,658	93·99
	Pay	1,853,616	518,452	1,141,682	193,482	..	3·23%	3·06%	
Laidley	Make	1,608,566	632,266	925,008	51,292	..	55,566	55,614	95·37
	Pay	1,608,614	653,935	910,672	44,007	..	3·58%	3·58%	
Lowood	Make	788,508	155,146	597,604	35,758	..	28,289	28,280	94·64
	Pay	788,499	164,561	592,722	31,216	..	3·72	3·72%	
Roma	Make	323,637	..	263,381	60,256	..	15,286	15,287	23·36
	Pay	323,638	69,832	192,240	61,047	519	4·96%	4·96%	
Murgon	Make	1,672,235	1,047,631	620,964	3,640	..	56,932	56,697	75·14
	Pay	1,672,000	1,315,639	353,917	2,444	..	3·52%	3·51%	
Proston	Make	793,673	490,041	281,120	22,512	..	30,691	31,037	91·58
	Pay	794,029	517,805	257,695	18,529	..	4·02%	4·07%	
Kingston	Make	3,004,792	1,836,912	1,005,536	162,344	..	93,600	93,055	100
	Pay	3,004,247	1,891,980	973,852	138,415	..	3·22%	3·20%	
Woodford	Make	1,109,222	728,503	361,537	19,182	..	32,796	52,112	95·2
	Pay	1,128,538	980,868	147,670	..	..	3·05%	4·84%	
Allora	Make	1,325,308	1,239,124	86,184	..	..	34,916	34,838	83·03
	Pay	1,325,230	1,233,201	92,006	23	..	2·71%	2·7%	
Inglewood	Make	405,496	192,024	199,920	13,552	..	12,710	12,807	70·49
	Pay	405,593	153,540	239,233	12,820	..	3·23%	3·26%	

OFFICIAL GRADINGS IN BOXES—*continued.*

Factory.	Boxes Submitted As Choice.	Grading Result.				Boxes Submitted As First.	Grading Result.			Boxes Submitted As Second.	Grading Result.		Pastry Quality.
		Choice.	First.	Second.	Pastry.		First.	Second.	Pastry.		Second.	Pastry.	
Grantham ..	7,282	2,200 30·21%	5,082 69·79%	..	..	20,115	19,492 96·90%	623 3·10%	..	3,716	3,489 93·89%	227 6·11%	..
Laidley ..	9,867	4,790 48·55%	4,935 50·02%	133 1·34%	89 ·09%	16,486	15,956 96·79%	530 3·21%	..	1,042	829 79·56%	213 20·44%	..
Lowood ..	1,889	1,252 66·28%	637 33·72%	..	..	10,850	10,548 97·22%	302 2·78%	..	587	459 78·19%	128 21·81%	..
Roma	..	..	..	..	..	292	292 100%	..	..	1,046	1,021 97·61%	25 2·39%	12
Murgon.. ..	11,344	5,879 51·82%	5,424 47·81%	41 ·37%	..	11,028	10,469 94·93%	523 4·74%	36 ·33%	65	65 100%	..	..
Proston ..	7,472	3,997 53·49%	3,411 45·65%	57 ·76%	7 ·10%	5,128	4,483 87·42%	603 11·76%	42 ·82%	379	261 68·87%	118 31·13%	..
Kingston ..	32,645	15,468 47·38%	17,177 52·62%	..	..	18,234	18,114 99·34%	120 ·66%	..	2,900	2,824 97·38%	76 2·62%	..
Woodford ..	12,073	1,212 10·04%	10,861 89·96%	..	..	6,456	5,385 83·41%	1,039 16·09%	32 ·5%	342	342 100%	..	..
Allora	1,8199	14,044 77·17%	4,155 22·83%	..	..	1,451	1,352 93·18%	99 6·82%	..	..	..	..	..
Inglewood ..	1,301	877 67·41%	424 32·59%	..	..	3,560	3,139 88·17%	421 11·83%	..	243	230 94·65%	13 5·35%	..

PRODUCTION, PAYMENTS, AND GRADINGS OF BUTTER IN QUEENSLAND, FOR THE YEAR ENDED 30TH JUNE, 1947—*continued.*

Factory.		Manufacture and Payments in Lb.					Over-run.		Make Graded.
		Total.	Choice.	First.	Second.	Pastry.	Actual.	Paid.	Per Cent.
Mill Hill	Make	1,452,006	1,437,222	1,288	13,496	..	30,339	43,973	28·2
	Pay	1,465,740	1,258,113	194,900	12,727	..	2·13%	3·09%	
Texas	Make	137,317	110,101	15,512	11,704	..	6,684	5,638	19·33
	Pay	136,271	70,740	53,656	11,875	..	5·12%	4·32%	
Cooroy	Make	930,190	732,958	177,016	20,216	..	30,746	30,856	89·56
	Pay	930,300	824,490	98,385	7,425	..	3·42%	3·43%	
Gympie	Make	4,700,789	4,091,120	526,400	83,269	..	173,427	171,117	92·65
	Pay	4,699,638	4,301,863	335,983	61,792	..	3·83%	3·78%	

Factories marked xx have also been dealing in cream, so over-run cannot be given.

OFFICIAL GRADINGS IN BOXES—*continued.*

Factory.	Boxes Submitted As Choice.	Grading Result.				Boxes Submitted As First.	Grading Result.			Boxes Submitted As Second.	Grading Result.		Pastry Quality.
		Choice.	First.	Second.	Pastry.		First.	Second.	Pastry.		Second.	Pastry.	
Mill Hill ..	7,053	6,484 91·93%	569 8·07%	..	..	23	23 100%	..	..	236	142 60·17%	94 39·83%	..
Texas	..	..	..	..	..	265	204 76·98%	61 23·02%	..	209	209 100%	..	..
Cooroy	11,373	8,342 73·35%	3,010 26·47%	21 ·18%	..	3,143	2,472 78·65%	671 21·35%	..	360	307 85·28%	53 14·72%	..
Gympie ..	66,896	53,535 80·03%	13,197 19·73%	164 ·24%	..	9,440	6,519 69·06%	2,921 30·94%	..	1,440	933 64·79%	507 35·21%	..

Junior Farmers' Clubs in Queensland.

NO movement in recent years has so captured the imagination of parents and the sympathy and goodwill of rural communities in general, on the score of its educational and character building value, as the Junior Farmers' Club Movement. In the other States of the Commonwealth the organization is firmly established, and its extension to Queensland, where it is already taking root, is warmly welcomed by all associated with the progress of the primary industries and by citizens generally.

Plate 17.
MR. T. L. WILLIAMS.

The success of any such movement depends largely on those directing it and particularly on the man appointed as State Organizer, and the Government has chosen Mr. T. L. Williams, formerly Minister for Agriculture and Stock and Minister for Education, for that important office. Mr. Williams has had a long association with agricultural and educational activities in this State as a teacher, journalist, and parliamentarian representing an important country constituency.

The organization and management of the first five Farm Boys' Camps held regularly during Show Week in Brisbane in pre-war years were entrusted to Mr. Williams by the Royal National Agricultural Association. Under his direction, the Junior Farmers' Club Movement in this State is already gaining momentum. Many applications from the sons of farmers who are either still at school or employed on farms are coming in, and as the new year advances enrolments are sure to increase rapidly.

In the course of a recent interview, Mr. Williams said that never before, perhaps, had it been so necessary to educate youth for rural enterprise. Australia would continue to be dependent on the wealth of her primary industries and, therefore, could not afford to ignore the educational and social needs of those engaged in those industries. If boys were to be asked to remain at home on the farm and become producers themselves they should be given every opportunity of getting practical training based on agricultural science and economics as an inducement to them to "stay put." An urge to obtain wider knowledge and experience was necessary, as well as an incentive to continue

in productive callings. As a former Minister for Agriculture and Stock he had often felt that there was definite obligation to provide training for young people on the land in modern methods of agriculture and to promote a right outlook towards rural pursuits; in addition to facilities already available, he believed that the Junior Farmers' Club Movement would go far towards fulfilling that national obligation.

Continuing, Mr. Williams expressed appreciation of the interest already aroused in the movement throughout Queensland. Club members would be urged to aim at the highest standards and make their own contribution, each in his own way, to the attainment of club objectives. Club membership would be free to boys and girls between the ages of 14 and 20 years, and the team spirit would be fostered in every way. The first school of instruction for club members would open at the Queensland Agricultural High School and College, Lawes, on the 15th, and continue until the 25th of March next. In addition to to periodical schools of instruction, field days would be held on selected farms in different districts and practical demonstrations would be arranged from time to time in co-operation with the advisory staffs of the Department of Agriculture and Stock and the Department of Public Instruction, district branches of primary producers' organizations and the Country Women's Association. It was anticipated that due prominence would be given in the country Press to club activities and cognate matters of news value, as well as in the *Queensland Agricultural Journal* in which, through the courtesy of the Hon. H. H. Collins, Minister for Agriculture and Stock, space would be provided for regular club features.

The success of the Junior Farmers' Club organization in Queensland was already assured, added Mr. Williams, for it was beyond question that extended agricultural education and improved rural amenities were necessary to Australia's economy, in which primary production was of outstanding importance. Moreover, the junior farmers' clubs were among the nation's finest assets.

THE JUNIOR FARMERS' CLUB MOVEMENT.

The Junior Farmers' Club organization was established in New South Wales in 1928, chiefly to check the drift of young people from the land. Its members, boys and girls between the ages of 10 and 21, were provided with definite objectives to induce them to cultivate an interest in the primary industries of their own districts and in their own rural environment. The movement took firm root and spread steadily. Throughout New South Wales there are now no fewer than 360 clubs with an aggregate membership of about 12,000. It also is firmly established in Victoria, South Australia, Western Australia, Tasmania and New Zealand. It should become a live issue in Queensland, where, hitherto, junior farmer work has been confined largely to home project clubs in State schools, especially in country districts. The need for providing means for a continuance of this project work by young people after they have left school is now widely recognised, and this need can be met by the formation of junior farm clubs in every district along the lines which have proved so successful in the South.

There junior farmers have already shown how to grow crops and breed and feed farm animals at less cost, how to conserve soil and its fertility and how to lay foundations of future agricultural prosperity. The building of better farms, better homes and better citizenship are already among their great achievements. On their own home farms club members are putting into practice the scientific principles of farming in all its branches. They have established the beginnings of

quality beef and dairy herds and apply improved techniques in crop production. Above all, they are proud of the fact that they are farmers and that farming is their chosen life vocation.

Between the schools and the home close contact is maintained. This is more effective than appears at first sight. Parents realize that their boys and girls are being treated as individuals, with individual tastes and inclinations; and there is a carry-over from the schools to the home which stimulates interest and confidence between both parents and their growing children. Development of the spirit of co-operation, community service, leadership and personal character are diligently fostered.

Field days on district farms are frequently arranged, and every district show has full entries from club members. Club interests are not entirely agricultural, for members also take an active part in the social life of the whole community. Debates, films, dances, excursions, camps and organized games are all included in regular club activities.

Character training is largely developed by the need for perseverance and hard work in carrying out club projects. Capacity for real work and pride in the job is inculcated on the principle that high wages and improved standards of living are ineffective, unless accompanied by a desire to put maximum effort and pride into the tasks undertaken.

Among other achievements of the junior farmers' clubs in the South are heavier crop yields over district averages; improvement in local agricultural practice; higher standards in country show exhibits; closer personal contact between junior farmers and their seniors at field days, show committee and council meetings; a steady increase in enrolments at agricultural high schools and colleges; and a decided stimulus in the development of advanced agricultural education leading to a more complete country life.

In regard to agricultural education particularly, these southern junior farmers' clubs have, very appropriately, initiated a vigorous drive for more secondary agricultural education for rural communities, and so provide opportunities for club members to become expert farmers and leaders in their own industry with a sound technical background. In every district the clubs have the assistance of local advisory committees of farmers and townspeople who give to them voluntary, effective and ungrudging service.

As to the future of the Junior Farmers' Club Movement, one young club member from the Northern Rivers (N.S.W.) speaking with every confidence put it to the Editor of the *Queensland Agricultural Journal* in this way: "The future responsibilities and opportunities of the J.F.C. for usefulness are immense and they will be rather an important factor, in my opinion, in developing our future agricultural production which is as necessary as industrial production. There is no reason why agriculture should not be on the same footing economically as other industries, for farmers, including junior farmers, are entitled to fair prices for the things they grow and to living standards and amenities comparable with those of their fellow citizens engaged in other industries."

The main object of the Junior Farmers' Club Movement is to keep farmers' sons and daughters on the land and, through vocational agriculture, enable them to develop their love of the land and their latent ability to become successfully established in farming for themselves. *"Learning to do; doing to learn; earning to live; living to serve."* That is their motto.

MARKETING

Production Trends.

Substantial rain fell in all farm and dairying districts during December, with sultry weather, accompanied by frequent storms, being experienced towards the end of the month.

The wheat harvest has been finalised. Frequent storms interrupted harvesting in the later stages, and caused some losses of grain both in the ear and in bagged wheat. However, the crop will exceed 10,000,000 bushels, which is a record for the State.

Farmers continued the plantings of general summer crops, including maize, grain sorghum, pumpkins, peanuts, fodders, &c., all of which are expected to return good yields.

Milk and cream supplies during December reached a level considerably higher than that for December, 1946. Butter production for December is estimated at 12,600,000 lb., as compared with 6,663,245 for December, 1946.

By the end of December, 15,000 tons of No. 1 grade potatoes had been marketed, comprising the bulk of the crop, which is expected to reach 18,000 tons.

The area planted to grain sorghum in the South Burnett by the end of December was estimated at 6,000 acres, and further plantings were expected during January. Crops in this area are making good progress. The acreage planted on the Darling Downs is less than that for last season, and yields are expected to be light.

Marketing of Primary Products.

An increasing demand for more and more regulatory control—in the interest of either grower, retailer or consumer—is some proof (if proof is needed) that our system of marketing primary produce leaves a lot to be desired.

Persistent demand for introduction of a docket system to check sales, for instance, evidences concern by growers that they are not always rendered a true account of what their produce brings. Growers who contract with retailers—particularly retailers in country towns—for direct sales of produce can produce further proof to support this claim.

Country retailers who obtain supplies from Sydney markets invariably pay more than suburban retailers, even after taking into account additional freight and handling charges. This is rarely, if ever, discernible on account sales rendered to growers whose produce finds its way to country centres. Further, prices paid by consumers contrast so oddly with returns to growers as to suggest that all is far from right with our system of distributing primary products.

It could be that the present system is basically wrong. In secondary industries, for example, the aim is to disperse to consuming centres products of those industries immediately they are manufactured. In primary industries the opposite process operates. Immediately products are harvested (call it "manufactured" if you like) they are hurriedly transported to a congested central market. Up to that stage, distribution is in reverse gear, and when subsequently it does get under way, it is dependent on a "come and get it" system, so different to the highly organised distribution methods of secondary industries.

That we have never had decentralised markets (suburban and country) is no argument against their establishment now. This may not be a complete answer to our present marketing-of-primary-products problem, but it would seem to offer more than is likely to be achieved by any attempt to patch-up the present system.—*Agricultural Gazette of New South Wales.*

GENERAL NOTES

Staff Changes and Appointments.

Mr. C. H. P. Defries, B.Com., H.D.A., A.F.I.A., Production Statistics Officer in the Marketing Division, has been appointed Assistant Director of Marketing, Marketing Division, Department of Agriculture and Stock

Banana and Papaw Levies.

The Executive Council has approved of the extension of the banana and papaw levy regulations under the *Fruit Marketing Organisation Acts* for a further period until 31st December, 1948. The sums raised by these levies are expended by the Committee of Direction of Fruit Marketing in the interests of the banana and papaw growers.

The banana levy is at the rate of ½d. per case containing 1½ bushels or less, or 1d. for every £1 of gross realisations where bananas are marketed in the bunch.

The existing papaw levy is at the rate of 1d. for every two cases, or 3s. 4d. per ton where the fruit is delivered to factories. An amendment of the regulation which has also been approved now provides for an additional levy of ½d. per case on papaws marketed south of Rockhampton, and a further 3s. 4d. per ton on factory papaws.

Council for Scientific and Industrial Research—Appointment of Mr. Bell.

The Acting Minister for Agriculture and Stock (Hon. A. Jones) has announced that advice has been received from the Prime Minister's Department that Mr. Arthur F. Bell, Under Secretary of the Department of Agriculture and Stock, had been appointed a council member of the Commonwealth Council for Scientific and Industrial Research and also Chairman of the Council's Queensland State Committee. Mr. Jones said that this appointment was a compliment to both Mr. Bell and the Department, as this was the first occasion on which a departmental officer from any of the States had been appointed to the Council. He anticipated that in his dual capacity as Under Secretary and Chairman of the Council's State Committee, Mr. Bell would be able to do much towards co-ordinating agricultural researches in Queensland. Mr. Bell has acted as a co-opted member of the Council for some time.

T.B. Testing of Dairy Herds.

The need for accelerating the tuberculin testing of dairy herds from which whole milk is supplied to consumers in the City of Brisbane was fully realised, stated the Acting Minister for Agriculture, the Hon. A. Jones, in the course of a recent Press statement. With this end in view the Department is endeavouring to obtain assistance from practising veterinary surgeons. Already a number of highly qualified men have expressed their willingness to assist in this work and three additional veterinary surgeons from another State have made enquiries with regard to private practice in Queensland.

Correspondence Course in Pig Raising.

The Correspondence course of instruction in Pig Raising provided by the Department of Agriculture is a service much appreciated by farmers carrying on mixed farming and dairying in Queensland. During the past year there were 136 new applicants for enrolment from all over the State.

The course was instituted in 1932 and after 15 years of operation still has a popular appeal, not only to older farmers but also to women and junior farmers who are anxious to expand their knowledge and keep up to date with modern methods of pig production.

The course of 49 lessons is free to all interested persons. Application for enrolment should be addressed to the Under Secretary, Department of Agriculture and Stock, Brisbane. The only expense involved is the cost of postage on returned examination papers.

Care of Mother and Child.

Under this heading an article supplied by the Maternal and Child Welfare Service of the Department of Health and Home Affairs, dealing with the welfare and care of mother and child, is published each month.

BUILDING UP HEALTH HABITS.

Rest and Sleep.

Last month we talked about the importance of the early establishment in toddlers of the right habits of exercise and play. Many parents do not realize that the habit of rest and sleep has equal importance in the life of the young child.

Sleep is nature's restorer. The body may starve for rest and sleep just as it may starve for food and many toddlers have far too little sleep. Children do not grow properly unless they have:—1. Enough sleep. 2. Regular sleep. 3. Sleep under the right conditions.

1. Enough Sleep.

Children from two to six years of age need *at least* 12 hours sleep each night and many do better with more than that. The child of early school age should have from 10 to 12 hours of sleep at night and a regular rest period during the day.

It is well for parents to know that an alert, energetic child does not store up enough energy even in a long night's sleep, to carry him through an active day. Therefore he must have a midday nap or rest of 2 hours if between the ages of two and four, at least 1 hour between the ages of four and six. Even if the child does not sleep, complete rest with relaxation will save his strength.

If he does not rest when he is tired his normal tiredness will soon become real fatigue and he will be cross and unhappy. A rest period before a meal helps both appetite and digestion.

2. Regular Sleep.

The child should go to sleep at the same time every day and night. When the habit of sleeping regularly is once formed the toddler will go to sleep quickly and naturally at his usual time.

3. Sleep under the Right Conditions.

A child should sleep in a bed by himself and whenever possible in a room apart from the adult members of the family. Sleeping on a veranda, provided the child is kept warm, is a great benefit to health. If sleeping in a room there should be a moving current of air between two open windows or a window and door, although the bed should be out of a direct draught in winter.

The bed should be comfortable and great attention should be paid to the mattress which should be straight and firm. A pillow is not necessary although a low one may be used if desired. Beds have a great effect on children's posture. Pyjamas and nightgowns should be loose and comfortable.

A child should go to bed happy and contented. The little trials and troubles of his daily life are just as real and important to him as those of grown-ups are to them. Therefore Mummy or Daddy should smooth them out for him before he goes to bed and pleasant thoughts should be put into his mind.

If his sleeping habits have been correctly managed from the start a child will regard going to bed as a normal part of his daily life and will not fuss or expect to be rocked to sleep or ask for toys or books to take to bed.

It is cruel to take little children out at nights and when father and mother wish to go out together they should arrange for a relation, friend or neighbour to be in the house with the sleeping children. There is a lot of room for the formation of friendly groups of women who will take turns in helping each other in this way and so ensure that children are not deprived of their sleep which is of such great importance to good development and stable nervous system.

Any advice on children's bedding or night clothing or other matters connected with sleeping may be obtained by communicating personally with the *Maternal and Child Welfare Information Bureau, 184 St. Paul's Terrace, Brisbane*, or by addressing letters *"Baby Clinic, Brisbane."* These letters need not be stamped.

IN THE FARM KITCHEN.

Fruit Cake.

Eight ounces self-raising flour, 3 oz. sugar, 3 oz. butter, 1 oz. candied peel, 6 oz. sultanas and currants, pinch of salt, 1 egg, ½ pint milk. Sieve the flour and salt and rub in the fat. Add the sugar, prepared fruit and shredded peel. Mix with the egg and milk. Put into a greased and floured 7-inch cake tin and bake in a moderate oven for about two hours.

Cheese Canapes.

Half a teacup thin parsley sauce, ¼ teaspoon dry mustard, 2 teacups grated cheese, 4 slices hot toast canapes. Pour sauce into the top of a double saucepan. Add mustard and cheese. Cook over boiling water, stirring constantly until cheese melts and the mixture is smooth. Divide equally between untoasted sides of canapes. Enough for four persons.

Fruit Trifle.

A sponge sandwich or remains of a stale plain cake, 1 pint of custard, 1 lb. of any fruit in season, a little jam, a gill of milk. Cut up the cake and spread half with jam, then arrange in a glass bowl. Pour a little hot milk over to soak cake. Put in a layer of fruit. Cover with rest of the cake and again pour in a little hot milk. Make custard and pour over whilst hot, but not boiling. Leave to get cold, then decorate with fruit.

Marrow and Tomato Savoury.

Half a pound of tomatoes (sliced), 1 medium onion (sliced) ½ oz. dripping, 1½ to 2 lb. vegetable marrow, salt and pepper, a pinch of mixed herbs, ½ teaspoon sugar, ¼ pint of hot water, chopped parsley. Fry the tomatoes and onion in the dripping for five minutes. Prepare the marrow and cut into small pieces. Add to the tomato and onion with the herbs, sugar and hot water, season to taste. Cover and boil gently for 30 minutes, or until the marrow is tender. Turn on to a hot dish and serve, sprinkled with chopped parsley.

Cucumber Boats.

One cucumber, a bunch of watercress, or a lettuce, a few radishes, a few spring onions or chives, a small tin of sardines or pilchards (if procurable). Wipe cucumber with a damp cloth, then split down lengthwise. Cut into 3 in. pieces, scoop out pith. Chop up the fish and onions or chives, mix well and season with black pepper. Chop up watercress or lettuce rather finely and spread over a large flat dish. Fill each piece of cucumber with the fish and onion mixture and add a dash of salad dressing. Set the boats on the sea of greenstuff, arrange a border of radishes, cut in halves and serve.

QUEENSLAND WEATHER IN DECEMBER.

Mainly good distribution of rain over the State during the month resulted in 46 per cent. above normal totals in South Coast Moreton, averaging 7½ inches with many over 10-inch totals registered, highest being 1,503 at Springbrook, 1,416 Murgon, 1,270 Nanango, and 1,259 Harrisville. Falls were 82 per cent. to 85 per cent. above normal on the Darling Downs, averaging 5 to 6½ inches, highest individual total being 1,029 points at Leyburn. Peninsula South, Central Highlands and Lowlands, South Coast Port Curtis, and Far South-west ranged from 0 to 24 per cent. above normal. Other divisions were below normal—Carpentaria, Peninsula North, and Warrego 11 per cent. to 29 per cent. below, Western districts 35 per cent. to 41 per cent. below, and Central and North Coast receiving the least benefit, being 53 per cent. to 62 per cent. below normal. Heaviest 24-hour fall for the month was 415 points at Morningside on 10th.

With the cumulative benefits of spring and December rains the general pastoral position over the greater part of the State should be the most favourable for this time of the year. General farming conditions in all districts are also above average, but the persistent rains over the wheat areas during the first half of the month proved a set-back to the unharvested 20 per cent. of the estimated 11,000,000-bushel record wheat yield. Apart from local rain and storm damage, water-logged ground prevented harvesting in several districts. Some damage was also reported in the Granite Belt fruit areas, but the dairying production output received considerable impetus.

Storm Damage.—Thunderstorms with local hail were very prevalent, especially in the south-eastern quarter. There were some local strong blows and isolated examples of tornadic activity. St. George suffered damage on the 19th, and on the 7th Rockhampton and Beaudesert reported hail as large as cricket balls. At Rockhampton there was a 70 m.p.h. wind gust.

Flooding.—With the persistent rains in the south-eastern quarter during the first half of the month all streams commenced to carry a considerable run-off and flooding of low-lying areas was fairly extensive. Main streams affected or reaching flood height reporting stage included Balonne, Condamine, Macintyre, Brisbane (Murrumba, Brisbane River watershed), Dawson, and parts of the Upper Mackenzie.

Temperatures.—Excepting in the Peninsula and western divisions, where temperatures were slightly above normal, it was a cool month for the State with maximum minimum temperatures chiefly .5 deg. to 1 deg. below normal, but 2 to 3 deg. below normal in the Maranoa and south-west districts. Winton, Cloncurry, and Camooweal had 22, 21, and 20 days respectively in the month when maximum temperature reached the 100 deg. mark, but most inland stations had less than 10 days. Highest maximum was 111deg. at Urandangie on 14th.

Brisbane.—Mean pressure $\frac{9+3}{2}$ 29.879 inches (normal 29.888 inches).

Temperatures.—Mean maximum 82.6 deg. (normal 84.7 deg.) ; highest 92.6 deg. on 22nd.
Mean minimum 67.0 deg. (normal 67.5 deg.) ; lowest 62.1 deg. on 10th.
Mean temperature 74.8 deg. (normal 76.1 deg.).

Rainfall.—814 points on 18 days (normal 506 points on 12 days). Highest December rain since 1,523 points in 1943. Highest number of rain days since 1942 (20 days).

Rain position is summarised below.

Division.	Normal Mean.	Mean December, 1947.	Departure from Normal.
	Points.	Points.	Per. Cent.
Peninsula North	702	525	25 below
Peninsula South	605	619	2 above
Lower Carpentaria	392	289	26 below
Upper Carpentaria	377	335	11 ,,
North Coast, Barron	690	327	53 ,,
North Coast, Herbert	690	263	62 ,,
Central Coast, East	454	207	54 ,,
Central Coast, West	333	128	62 ,,
Central Highlands	316	393	24 above
Central Lowlands	221	221	..
Upper Western	184	109	41 below
Lower Western	137	89	35 ,,
South Coast, Port Curtis	455	504	11 above
South Coast, Moreton	509	745	46 ,,
Darling Downs, East	351	648	85 ,,
Darling Downs, West	277	503	82 ,,
Maranoa	258	463	79 ,,
Warrego	215	152	29 below
Far South-West	155	175	13 above

Commonwealth of Australia, Meteorological Bureau, Brisbane.

ASTRONOMICAL DATA FOR QUEENSLAND.

FEBRUARY.

Supplied by W. J. NEWELL, Hon. Secretary of the Astronomical Society of Queensland.

TIMES OF SUNRISE AND SUNSET.

At Brisbane.			MINUTES LATER THAN BRISBANE AT OTHER PLACES.					
Date.	Rise.	Set.	Place.	Rise.	Set.	Place.	Rise.	Set.
	a.m.	p.m.						
1	5.21	6.42	Cairns	41	17	Longreach	40	30
6	5.24	6.40	Charleville ..	29	25	Quilpie	34	36
11	5.28	6.36	Cloncurry	57	42	Rockhampton ..	15	5
16	5.32	6.32	Cunnamulla ..	28	30	Roma	18	16
21	5.35	6.28	Dirranbandi ..	18	20	Townsville	34	16
26	5.38	6.23	Emerald	24	14	Winton	46	34
29	5.40	6.21	Hughenden ..	42	27	Warwick	3	5

TIMES OF MOONRISE AND MOONSET.

At Brisbane.		
Date.	Rise.	Set.
	p.m.	a.m.
1	10.56	11.19
		p.m.
2	11.30	12.19
3	..	1.18
	a.m.	
4	12.08	2.16
5	12.50	3.13
6	1.36	4.07
7	2.26	4.57
8	3.19	5.42
9	4.14	6.23
10	5.09	6.59
11	6.04	7.32
12	6.58	8.02
13	7.50	8.31
14	8.44	8.59
15	9.37	9.29
16	10.32	10.00
17	11.30	10.36
	p.m.	
18	12.32	11.18
19	1.36	..
		a.m.
20	2.42	12.06
21	3.46	1.04
22	4.45	2.09
23	5.38	3.20
24	6.24	4.33
25	7.05	5.44
26	7.42	6.53
27	8.17	7.59
28	8.52	9.03
29	9.27	10.05

MINUTES LATER THAN BRISBANE (SOUTHERN DISTRICTS).

Charleville 27; Cunnamulla 29; Dirranbandi 19;
Quilpie 35; Roma 17; Warwick 4.

MINUTES LATER THAN BRISBANE (CENTRAL DISTRICTS).

Date.	Emerald.		Longreach.		Rockhampton.		Winton.	
	Rise.	Set.	Rise.	Set.	Rise.	Set.	Rise.	Set.
1	24	15	40	31	15	6	46	35
6	30	9	45	24	20	0	53	26
11	25	14	42	29	17	4	49	33
16	15	24	30	40	6	15	35	46
21	9	30	25	45	0	21	26	53
26	18	22	34	38	9	13	38	43
29	25	14	42	30	16	5	48	34

MINUTES LATER THAN BRISBANE (NORTHERN DISTRICTS).

Date.	Cairns.		Cloncurry.		Hughenden.		Townsville.	
	Rise.	Set.	Rise.	Set.	Rise.	Set.	Rise.	Set.
1	40	20	57	44	42	29	33	18
3	50	10	64	37	48	23	41	10
5	53	4	67	33	50	19	44	5
7	55	3	68	32	51	18	45	4
9	52	8	66	36	50	21	43	8
11	44	16	61	41	45	26	37	15
13	34	26	54	47	38	33	29	22
15	25	36	47	55	32	40	21	31
17	15	45	40	60	25	46	14	37
19	6	53	35	66	20	51	6	44
21	3	55	34	67	18	52	4	45
23	10	51	37	64	22	50	9	43
25	20	40	44	58	29	43	18	34
27	33	28	52	49	37	34	27	24
29	43	17	60	42	45	27	36	16

Phases of the Moon.—Last Quarter, February 2nd, 10.31 a.m.; New Moon, February 10th, 1.02 p.m.; First Quarter, February 18th, 11.55 a.m.; Full Moon, February 25th, 3.16 a.m.

On February 15th the Sun will rise and set, respectively, 15 degrees South of true East and true West, and on the 14th and 26th the Moon will rise and set at true East and true West.

Mercury.—Will remain in Aquarius all this month. On the 1st it will set 1 hour after the Sun and will reach greatest angle East of the Sun on the 4th. On the 20th it will be at inferior conjunction, and by the end of the month will rise 1½ hours before Sunrise.

Venus.—In the constellation of Pisces, will set nearly 2 hours after the Sun during this month.

Mars.—At the beginning of the month in the constellation of Leo, will rise between 8 p.m. and 9.15 p.m. On the 18th it will pass to the North of Regulus and will be in opposition to the Sun on this date. At the end of the month Mars will rise between 5.30 p.m. and 7 p.m.

Jupiter.—Now a morning object. On the 1st, in the constellation of Ophiuchus will rise between 1.30 a.m. and 2.45 a.m., and at the end of February, in the constellation of Sagittarius, will rise about midnight.

Saturn.—In the constellation of Leo, will be in opposition to the Sun on the 9th. On the 1st it will rise 1 hour before Mars and by the end of the month will rise ¾ hour before that planet. Saturn will then lie southward of Mars and be the fainter of the two.

N
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New Moon
Full Moon
First Quarter
Last Quarter
Mercury
Venus
Mars
Jupiter
Saturn
Merak
Dubhe
Kochab
LITTLE DIPPER
BIG DIPPER
DRACO
Alkaid
Mizar
Alioth
Phecda
Megrez
Alkaid
Mizar
Cor Caroli
Arcturus
Alphecca
Kaus Borealis
Ras Algethi
Rasalhague
OPHIUCHUS
Antares
SCORPIO
SAGITTARIUS
CAPRICORNUS
Spica
VIRGO
Zuben el Genubi
Zuben el Schemali
LIBRA
28th
5th
Denebola
Algieba
Regulus
LEO
CANCER
Alphard
CENTAURUS
Pointers
Southern Cross
False Cross
South Pole
TRIANGULUM AUST.
ARA
PAVO
INDUS
GRUS
HYDRUS
Canopus
ARGO
Alphard
Procyon
Sirius
Betelgeuse
Aldebaran
Rigel
Saiph
ORION
Bellatrix
Alnath
Menkar
Nath
Capella
Mirfak
Algol
Almach
Mirach
Hamal
Sheratan
Diphda
ARIES
TAURUS
GEMINI
Pollux
Castor
Alpha
Beta
Gamma
Zeta
Eta
Mu
Nu
Tau
Kappa
Iota
Rho
Sigma
Omicron
Pi
Epsilon
Delta
Lambda
Phi
Chi
Psi
Omega
Theta
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Xi
Omicron
Pi
Rho
Sigma
Tau
Upsilon
Phi
Chi
Psi
Omega

RAINFALL IN THE AGRICULTURAL DISTRICTS.

DECEMBER RAINFALL.

(Compiled from Telegraphic Reports.)

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Dec.,	No. of years' records.	Dec., 1946.	Dec., 1947.		Dec.,	No. of years' records.	Dec., 1946.	Dec., 1947
North Coast.	In.		In.	In.	*South Coast—contd.*	In.		In.	In.
Atherton	7·02	42	2·02	3·80	Caboolture	5·48	67	2·94	6·63
Cairns	8·53	61	2·27	1·55	Childers	5·80	48	4·50	4·28
Cardwell	7·95	71	1·12	6·89	Crohamhurst	7·19	50	3·00	7·07
Cooktown	6·53	67	4·64	4·35	Esk	4·76	56	2·80	11·77
Herberton	5·64	57	2·50	3·92	Gatton College ..	3·89	44	2·81	9·70
Ingham	6·77	51	1·66	1·12	Gayndah	4·21	72	4·06	5·17
Innisfail	11·16	62	4·86	2·61	Gympie	5·40	73	2·05	6·06
Mossman	8·00	19	4·88	3·21	Kilkivan	4·61	62	3·00	7·12
Townsville	5·33	72	1·21	1·33	Maryborough ..	5·05	72	2·21	3·93
					Nambour	6·65	47	3·51	6·61
Central Coast.					Nanango	3·86	61	2·27	12·70
Ayr	4·20	56	1·95	2·37	Rockhampton ..	4·67	72	2·37	4·43
Bowen	4·49	72	1·40	1·16	Woodford	5·34	55	2·44	8·64
Charters Towers ..	3·26	61	2·08	1·89					
Mackay	6·86	72	1·17	2·96	*Darling Downs.*				
Proserpine	7·72	40	1·15	1·37	Dalby	3·49	73	1·82	6·98
St. Lawrence ..	4·67	72	2·11	2·13	Emu Vale	3·52	47	2·98	7·75
					Jimbour	3·44	64	2·00	3·39
Central Highlands.					Miles	3·17	58	2·33	6·82
Clermont	3·77	47	2·67	3·07	Stanthorpe	3·56	70	4·00	6·00
Springsure	3·28	74	2·53	7·00	Toowoomba	4·53	71	2·65	7·83
					Warwick	3·50	78	4·97	7·03
South Coast.									
Biggenden	4·85	44	2·84	1·64	*Maranoa.*				
Bundaberg	5·10	60	1·44	8·07	Roma	2·59	69	1·26	4.32
Brisbane Bureau ..	4·95	95	6·11	8·14	St. George	2·09	62	2·31	3·86

CLIMATOLOGICAL DATA FOR DECEMBER.

(Compiled from Telegraphic Reports.)

Divisions and Stations.	Atmospheric Pressure Mean at 9 a.m.	Shade Temperature.		Extremes of Shade Temperature.				Rainfall.	
		Mean Max.	Mean Min.	Max.	Date.	Min.	Date.	Total.	Wet Days
Coastal.	In.	Deg.	Deg.	Deg.		Deg.		Pts.	
Cairns	..	89	73	92	29, 31	70	7, 8, 21	155	12
Herberton	..	84	63	92	23	57	11	392	13
Townsville	..	88	75	96	26	67	9	133	4
Rockhampton	29·87	89	69	98	22	62	8, 15	443	9
Brisbane	29·91	83	67	93	22	62	10	814	18
Darling Downs.									
Dalby	..	85	63	94	22, 23	56	5	698	15
Stanthorpe	..	79	57	90	23	46	5	600	15
Toowoomba	..	80	59	90	23, 24	50	5	783	18
Mid-Interior.									
Georgetown	29·83	95	73	100	23, 26	67	11	373	8
Longreach	29·83	99	71	108	23	61	4	75	4
Mitchell	29·85	89	63	102	23	51	27	274	8
Western.									
Burketown	..	96	75	100	22, 23	65	4	112	5
Boulia	29·77	101	73	114	20	59	3, 4	20	1
Thargomindah	29·78	92	68	102	19, 20 29, 30	58	4	192	4

A. S. RICHARDS,
Deputy Director, Meteorological Service

Commonwealth of Australia,
Meteorological Bureau, Brisbane.